

THE
PHILOSOPHY OF MEDICINE:

OR,

MEDICAL EXTRACTS

ON THE

NATURE OF HEALTH AND DISEASE,

INCLUDING THE

LAWS OF THE ANIMAL ECONOMY,

AND THE

DOCTRINES OF PNEUMATIC MEDICINE.

BY

A FRIEND TO IMPROVEMENTS.

There are three things which almost every person gives himself credit for understanding, whether he has taken any pains to make himself master of them or not.—
These are: 1. *The art of mending a dull fire*; 2. *Politics*; and, 3. *PHYSIC*.

DR. REDDERS.

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O F
I N D I R E C T S T I M U L I.

SECTION I.

INTRODUCTION.

THE *blood vessels*, the *absorbents*, the *stomach*, and *intestines*, (which might, without much impropriety, be called HOLLOW MUSCLES,) are in *constant action* from the *stimuli* appropriated to them. The LOCOMOTIVE MUSCLES, when not acted upon by the *nervous electricity* * darted into them by the will, are nevertheless in *constant action*, as is seen in the tremor of old men, in the palsy of the head, and from the contraction of antagonist muscles, when those which counterpoise them are cut through, or lose their action (called by Haller their *vis insita*;) from a paralytic affection.

THE IRRITABLE FIBRE therefore, from the moment of its existence to that of its dissolution, being constantly surrounded by principles which act upon it, and stimulate it, and upon which it re-acts, it follows, that during the period of its existence, the IRRITABLE FIBRE is in *continual action*; that its

* The *celerity* of *electricity* keeps pace with the *celerity* of *volition*, and therefore seems peculiarly adapted to explain the phenomena of the nervous system. When Louis the XVth. from a motive of curiosity, commanded a battalion of 2000 men to stand hand in hand, to receive the electric circuit through their bodies, the last man felt the shock at the same instant with the first. So in the act of volition, the moment the mind wills the hand to be moved, it is moved; but without our being conscious of the manner how; because it was not necessary we should know it was done by the mind directing the nervous electricity into the moving fibres of the part.

existence consist^s in *action*, and that it is not in a passive state, as some authors have asserted.

The *continued actions* going on in organized animated beings *expend* the IRRITABLE PRINCIPLE in the fibre, whether THAT be,

1st. OXYGEN derived from the air to the blood.

2d. The NERVOUS ELECTRICITY; or some as yet

3d. UNPERCEIVED POWER in the fibre.

PROP. I.

If the *supply* of the IRRITABLE PRINCIPLE to the moving or sentient fibre, be *equal* to the *expenditure* by the action of stimuli, and these be in due proportion, the fibre is then said to be in a state of TONE*.

PROP. II.

But if the *supply* given to the fibre *exceed* the *expenditure*, the fibre is then said to be in a state of ACCUMULATION†.

PROP. III.

Vegetable and Animal Poisons‡.

* This consideration, which included the Nature of Health, we pursued from Vol. I. page 254, to Vol. II. page 307, which naturally conducted us to the consideration of the effects of an *undue proportion* of STIMULI, producing diseases called sthenic, with the method of cure, from Vol. II. p. 310, ending p. 612.

† We next pursue a new train of diseases, called asthenic, with the method of cure, from Vol. III. page 1, ending at Vol. IV. page 114.

‡ This consideration is pursued from Vol. IV. page 117, to nearly the conclusion of Vol. V.

LAW II.

A defective Stimulation of any Organ
accumulates Irritability in the
Moving and Sentient
Fibres.

OUR
RELATIONSHIP
TO
IMPURE AIRS.





S E C T. II.

ON VEGETABLES GIVING OUT VITAL AND IMPURE
AIRS.

It is curious to observe how the *animal* and *vegetable tribes* mutually support each other, through their whole existence ! Vegetables, by emitting *vital air* during the day, purify the atmosphere for the use of animals ; while the *fixed air* expired by animals affords nourishment to vegetables. But at the time when this diffusible stimulus is less wanted, sleep being desirable, the vegetable race then pours forth *azotic air*.

It was Dr. Priestley who discovered, in the year 1772, that plants emitted VITAL AIR and absorbed FIXED AIR ; for which discovery he received the thanks of the *Royal Society*, in an eloquent speech delivered by the president ; “ From your discoveries,” says Sir John Pringle, “ we are assured, that no vegetable grows in vain, but that, from the oak of the forest, to the grass in the field, every individual plant is serviceable to mankind ; if not always distinguished by some medicinal virtue, yet making a part of the whole, which cleanses and purifies our atmosphere. In this the fragrant rose-tree and deadly night-shade co-operate : nor is the herbage, nor woods that flourish in the most remote and unpeopled regions, unprofitable to us, nor we to them, considering

“ fidering how constantly the winds convey to them
 “ the FIXED AIR iffuing from our lungs, while
 “ they fend out VITAL AIR for us.” Mr. Scheele having made fome experiments diametrically oppofite to this pofition, Dr. Priestley employed ~~the~~ whole fummer to repeat his former experiments, and perceived that upon many occafions AZOTIC AIR was given out, but he confeffes, “ he could not difcover the caufes of this circum-
 “ ftance.” This laurel was referved to decorate the brow of the laborious and ingenious Dr. Ingenhouz, phyfician to her Imperial Majefty. He firft fhewed, that the trunk and foliage of plants gave out VITAL AIR only in the prefence of *light*. Hence if you put a plant under water in an inverted tumbler, and expofe it to the rays of the fun, in a few minutes air will be given out, and upon examining this, it will be found to be the pureft VITAL AIR: or if fucceffive plants be put into *azotic air*, it will be fo ameliorated, that combuftion will be fupported in it, and it will poffefs the nature, and moft probably the fame identity, as common air: or if a plant be expofed under thefe circumftances to *inflamnable air*, it will form a truly explofive air *. This philofopher, at the fame time,

* That inflamnable air and vital air when mixed are explofive, is a very valuable difcovery, which enabled this philofopher to give a diftinct theory of gunpowder, and the wonderful phenomena of earthquakes. Vide his *Nouvelles Experiences et Observations fur divers Objets de Phyfique*, in four volumes octavo.

discovered

discovered that in *the absence of light*, not VITAL, but AZOTIC and FIXED, AIRS,* were given

* If we cast our regards with astonishment on the vast scene of that perpetual rotation of organized beings; when we consider that all living animals, by their respiration, perspiration, digestion of food, by the putrid fermentation of their bodies after death; that all vegetables as long as they live, as well as when they are in a state of decomposition after death; that in combustion, and, in short, in an infinite variety of operations, every where obvious on the surface of the earth, they have one general effect, that of producing carbonic acid, or FIXED AIR; if we consider, I say, that all these conspire, as it were, in forming this compound substance (carbon and oxygen) it is possible to doubt that this fluid, the carbonic acid or fixed air, has an utility as extensive as its almost universal production?

But it may be asked, why is not *fixed air* to be found in the atmosphere? The solution is given us by this admirable philosopher himself. "This union of carbon and oxygen in the state of air, having a greater *specific gravity* than atmospheric air, quits, almost as soon as it is generated, the common stock, sinks to the ground, and being easily miscible with water, percolates through the ground to become the food of plants, and in the rays of the sun is decomposed, supplying them with their carbon, or wood. Thus 3 cubic inches of a *triplex lucida* in common water produced in six hours in bright sunshine 3 measures of VITAL AIR, quality 228; whereas in strongly aerated water it produced 9½, and whose quality above atmospheric air was 28½." Dr. Ingenhousz also discovered that common air was absorbed by plants as well as water, which in the sunshine were decomposed and gave out their common principle, viz. VITAL AIR. See his ingenious Dissertation *on the Food of Plants*, presented to the BOARD OF AGRICULTURE, and printed by their order; and his *Experiments on Plants*, which were first published in English, and afterwards in French.

out;

out; and that even during the sunshine, flowers, roots, and ripe fruit, always produced these deleterious airs. Hence, he taught us the true relation we stand in with regard to the *vegetable race*, and he has also extended these curious and beautiful researches by ascertaining the different proportions of VITAL AIR to the AZOTIC AIR, in different situations, and has demonstrated, that in a given quantity of atmospheric air, "there is more " VITAL AIR in the country than in towns; and " more near the sea than inland;" nevertheless he found by his *eudiometer*, "less in the marshy lands " of *Holland* than at *Vienna*, and he attributes the " *keenness of appetite, and quickness of digestion, in the " latter place, to this circumstance.*"

With what ADMIRABLE OECONOMY then has the SUPREME ARCHITECT established this *reciprocal intercourse* between the *animal and vegetable kingdoms*! By what ELEGANT SIMPLICITY OF DESIGN are the different parts of nature thus rendered at once subservient to the mutual support of each other respectively, and to the general well-being and harmony of the whole!

S E C T. III.

OF ASPHYXIA FROM UNRESPIRABLE AIRS.

WHEN an animal is immersed in water, his pulse becomes weak and frequent; he feels an anxiety about his breast, and struggles to relieve it; in these struggles, he rises towards the surface of the water, and throws out a quantity of air from the lungs. After this, his anxiety increases, his pulse becomes weaker; the struggles are renewed with more violence; he rises towards the surface again; throws out more air from his lungs, and makes several efforts to inspire; and in some of these efforts, a quantity of water commonly passes into his mouth; his *skin* then becomes *blue*, particularly about the *face* and *lips*; his *pulse* gradually *ceases*; the *sphincters* are relaxed, and he falls down *without sensation*, and *without motion*.

This description of *drowning* applies, as far as the circumstances admit of comparison, to the *effects* occasioned by *unrespirable airs*. I have had occasion, says Dr. Beddoes, to remark them in a number of persons, who were curious to try how long they could breathe HYDROGEN GAS. The *frequency* and *debility* of the *pulse*; the *blueness* of the *lips* and *coloured parts* of the *skin*, were very observable in a minute, or a minute and an half. Besides, *dizziness* was felt, and the *eyes* have grown *dim*; in animals, the

the transparent cornea has appeared sunk and shrivelled, the skin has become flaccid, and the body was as it were collapsed. Several individuals agree in describing the incipient insensibility produced by the hydrogen air as highly agreeable. During this process, I have felt the *pulse* nearly *obliterated*. Afterwards, as the persons have recovered, it becomes sensibly *fuller* and *stronger* than before the inspiration. This fact, continues Dr. Beddoes, belongs to a general principle now beginning to be understood; "WHEN THE ORDINARY POWERS HAVE BEEN, FOR A SHORT TIME, WITHHELD FROM THE BODY, THEY ACT AFTERWARDS WITH GREATER EFFECT," as holding the fingers to the *fire* after handling *snow* occasions severe aching.

In a late publication *, says that ingenious physician, we find many experiments, which confirm the opinion here advanced, that the unrespirable airs destroy by disarming the system of its moving principle, yet do they at the same time tend to refute the idea of those, who have supposed, that they produce this deleterious effect *solely* by the exclusion of the oxygen of the atmosphere. Between these airs there seems a remarkable difference in their power to produce insensibility and death. Hydrogen, or inflammable air, appears the least noxious, both when inspired alone, or mixed with atmospheric air. Azote comes next; then fixed air; and the hydrocarbonate appears extremely ac-

* *Considerations on the Medicinal Use of Factitious Air, &c.*

tive, and, I presume, adds Dr. Béddoes, that, for recovery from asphyxia in water (when but little goes down the wind-pipe *) or hydrogen air and azote will be much more easy, than from asphyxia occasioned by other unrespirable mediums. It may be reasonably conjectured, that fixed air, and hydrocarbonate, act by combining with the oxygen already in the blood, as well as by its excluding

* As the intention of this work is to set forth truth, and not to combat *erroneous opinions*, the reader will not be surprised to find this question, "Whether the introduction of water into the wind-pipe is, or is not, the immediate cause of death in drowning?" as mentioned by De Haen, and others, wholly overlooked in the Section professedly treating on the recovery of drowned persons. We will however consider it for a few moments in this place. If an artificial *drop of the chest* be produced by injecting two ounces of water into the lungs, through the wind-pipe of a healthy animal, it immediately causes oppression, and difficulty of breathing, but no fatal asphyxia ensues; but the water is gradually absorbed, and the symptoms soon disappear. In drowning, the case is very different, since a few minutes submersion is sufficient to destroy the life of the animal, even if no water enter the wind-pipe, or not, for in most cases, none is found in the lungs after death. This is decisively proved by the justly celebrated Dr. Goodwin. He placed animals in quicksilver and in oil, and so little of this weighty metal or coloured fluid was found in the lungs as left no doubt of it not being the proximate cause of drowning. In one experiment after expiration the animal was drowned in ink, and no fluid whatever was found in the lungs. Vide Dr. Goodwin's *Essay on Life as connected with Respiration*, to which was adjudged the gold medal.

PROPTER *optimam* DISSERTATIONEM DE RESUSCITATIONE.

this principle: and this conjecture is supported by the hydrocarbonate possessing a much less effect, when it has deposited some part of its charcoal; as also from the alteration which it is found to produce upon the blood*.

Mine and Coal-pits are frequently infested with two species of noxious air. The first is termed by the miners *Choke damp*, which is fixed air, which being specifically heavier than atmospheric air, occupies the bottom of the mine. The other is called the *Fire-damp*, which is inflammable air, and being ten times lighter than common air, ascends to the upper region of the mine. The former is probably formed from the *charry matter* in the bowels of the earth, the latter from a fine *aqueous exhalation*, and spontaneous *decomposition*. But *here* we are to consider the *manner* in which *these evils are to be remedied*, rather than the mystery of *their formation*.

* "Having," says this ingenious experimentalist, "put two fowls, the one in *fixed air*, and the other in *hydrocarbonate*; to my great surprise, I found in the *former* the same appearances as in drowned or strangled animals, only the liver appeared a shade paler. But in the *latter* the whole flesh was throughout of a *light pink* colour when boiled, and the marrow of a fine *red*. The *former* tasted nearly as usual, the *latter* was certainly much more tender." Other acids, beside the carbonic acid, produce the same change on *venal blood*, rendering it of the *arterial colour*. The *hydrocarbonate air* is the happy discovery of the ingenious Mr. Watt, one of the first chemists of the age.

To

To obviate the *fire-damp*, miners are in the habit of crawling on their hands and feet, and with a taper affixed to a long stick set fire to the inflammable air*, which sometimes goes off with a terrible and sometimes fatal explosion.

With respect to the *choke-damp*, no means have yet been devised but *ventilation*, it being supposed to be stagnated air. However, as to the mode of *ventilation*, and the *correction* of this species of air, we will offer a few hints.

A *shaft* †, as it is called, should be carried down somewhat slanting, and the funnel conveyed to the bottom

* Some years back a scheme was projected at Whitehaven to light up that town by means of the *inflammable air* in the pits, which was to be conveyed by pipes throughout every street. As chemistry advances may not the water of the Thames be *decomposed* in certain appropriated places, and the *inflammable air* conveyed throughout the Strand and City, and this part of the town be *permanently illuminated* each night at a very moderate expence?—Since the discovery of the nature of *combustion*, and the constituent principles of water, it is hoped that the candid reader will not consider the hypothesis as a mere rhapsody. Were a person to survey London now illuminated as it is by *Argand's lamps*, and the produce of the *Greenland fisheries*, and compare it with what it was *five hundred years back*, and he will perhaps feel inclined to extend his views on the prospect of *future improvements*!

† It is pleasing to observe the knowledge which our ancestors had of the nature of air. Ray, in a work, entitled *The Wisdom of God manifested in the Works of Creation*, written in the last century, says, page 73, in speaking of air—

bottom of the pit, whereby the heavier and purer air from above would descend; while a perpendicular shaft, or chimney, with its mouth arising from the

Steph. "Indeed, were there no damps in mines, yet the "nitrous part" (the NITROGEN or OXYGEN as it is now called) "of the air being spent and consumed by the breathing of the miners, the remaining part" (the AZOTIC) "would be unfit for respiration, unless new and fresh air were to succeed."—In another place he says, page 72, "The air is the fuel of the VITAL FLAME, without which it would speedily languish and go out."—Again he says, page 73, "*Fishes, and other water animals, cannot support life without it, for if you put your hand or any cover over a vessel containing fish, so as wholly to exclude the air, they will be suddenly suffocated.*"—Again, page 74, "Neither is it less necessary to *injects*, for if you put oil upon them, so as to obstruct those orifices that draw in air, if you obstruct only some, the parts that are supplied with air from them are shortly deprived of MOTION, while the rest of the parts that are untouched retain it."—Again, page 75, he says, "I am persuaded with my learned friend Dr. Hulse, that the chief use of the circulation of the blood, through the cotyledons of a calf in the womb (which I have often dissected), and by analogy through the *placenta uterina*, seems to be THE IMPREGNATION OF THE BLOOD WITH AIR" (he has above explained the species of air) "for the feeding the *vital flame*: for if it were only for nutrition, what need of two such great arteries to convey the blood thither? Secondly, I have observed the *umbilical vessels* to terminate in a multitude of PAPILLÆ. Now these PAPILLÆ do resemble the RADII of a fish's GILLS, and most probably have the same use, viz. TO SEIZE AIR, and convey it to the fetus, so that the fetus in the womb doth resemble a fish in its mode of living, or

"else

the top, would carry up the lighter and corrupted air together with the inflammable.

Should *fixed air*, notwithstanding this, stagnate in some parts of the pit, an engine such, as they water gardens with, should be used to *absorb* the *fixed air*, or else water should be kept continually ~~boiling~~; for as the steam condenses, it would become *impregnated* with the *fixed air*. This ought constantly to be observed, where *charcoal fires* are employed. A tea-kettle boiling by the side would obviate the chief, if not the whole, of the evil.

In the *Hist. de l'Academie des Sciences*, Anno 1710, we are told of a baker of *Chartres*, going along with his son, a robust young man, into a cellar 36 stairs deep, who followed him with a candle, the candle went out on the middle of the stairs. Having lighted it afresh, he was no sooner got into the cellar, than he cried out for help, and they heard no more of the son or father. His brother, an able youth, ran immediately after him, cried out he was dying, and was heard no more. He was followed by his wife, and she by a maid, and still it was the same. Such an accident struck the whole neighbourhood with a panic, and no one ~~would~~ forward to venture any farther, till a fellow more hardy and zealous than the rest, persuaded

"else why should there be such an instant necessity of *respiration* so soon as the *fœtus* is fallen off from the womb?" Ray acknowledges reading the works of Hook, whom he greatly compliments, but never once mentions Mayow.

that the five people were not dead, would go down to give them help. He cried too, and was heard no more. Upon this a *sixth man*, taking with him a hook, drew the last of them forth without going to the bottom, who, fetching a deep sigh, died. Next day the baker's friend, undertaking to get up all the carcases with the hook, was let down with ropes. He called out, and in the haste the rope breaking, he fell into the cellar, and was dead. The magistrates, taking cognizance of the case, the physicians were consulted, who advised a good deal of *water* to be thrown down. This being performed, a dog and a lighted candle were let down without injury to either, and the dead bodies in this cellar were taken out.

Lime-kilns throw off large quantities of *fixed air*; and those who incautiously lay themselves down either on the walls of the kiln, or so near as to be exposed to the vapour which rises from the burning lime stone, often experience its pernicious effects. Some years ago, I remember a poor family, says Dr. Falconer of Bath, who lodged in a room adjoining to a lime-kiln; during the night the vapour of the burning lime made its way into the room, and the four persons of which the family consisted were all killed. In the morning they were found lying as in a composed sleep, without any appearance of having gone through either pain or struggle.

In the spring of the year 1778, two disorderly young women, after rambling about the town for

a con-

a considerable part of the night, crept early in the morning into a little hovel which was contiguous to a *lime-kiln*. The kiln was charged and burning, and the vapour of the lime was forced through some crevices into the hovel. After some hours, the man who had the care of the kiln came to look after his work, and finding these women as he supposed asleep, went away without disturbing them. Some time after he returned, and seeing them still in the same place, endeavoured to awaken them, but in vain; they were cold and motionless. In one there did not appear to be the least remains of life; and in the other there was only a slight and indistinct movement about the heart. This patient was soon conveyed to the hospital. By proper means she was recovered, and ran away from the hospital, without expressing the least sense of gratitude for the care and humanity which had been exercised towards her. The other was not conveyed to the hospital so early, and the same means were used, but without success.

There is a small *grotto* at the foot of a little hill*, about 3 feet high, 12 long, and 6 broad; from the ground there arises a thin insensible vapour visible enough to a discerning eye, which does not spring up in little parcels here and there, but is one continued stream, covering the whole surface of the bottom of the cave; and has this remarkable difference from common vapours, that it does not, like

* Called *Crotto del Canto*.

Smoke, disperse itself into the air, but quickly after its rise falls back again, and returns to the earth; the colour of the sides of the *grotto* being the measure of its ascent, for so far it is of a darkish green, and higher only common earth, and therefore we find no inconvenience by standing in it; and so no animal, if its head be kept above this mark, is in the least injured. But when a dog or any other creature is forcibly held below it, or by reason of its smallness cannot hold its head above it, it presently, like one stunned, loses all motion, falls down as dead, or in a swoon, the limbs are convulsed and trembling, till at last no more signs of life appear than a weak and almost insensible beating of the heart and arteries, which, if the animal be left there a little longer, quickly ceases too, and then the case is irrecoverable, but if snatched out, and laid in the open air, it soon comes to life again, and sooner yet if thrown into the *adjacent lake*.

The *Russians* and *Germans* are frequently exposed, during their cold season from the *noxious air* of their stoves, and want of due ventilations. As soon as a person with them is discovered to be deprived of sense and motion, he is stripped naked, and brought into the *open air*; where he is rubbed with *snow*, or *cold water* is dashed repeatedly over the surface of his body.

To attempt to restore *lost heat*, by the application of cold water, or snow, must appear preposterous folly to those who have long been in the habit

habit of applying *artificial heat*; whether the sufferer is drowned under the thick ice; suffocated by inflammable air; or bleached by the drifted snow.

How can we reconcile this practice in such different cases to the suggestions of common sense! Shall we with John Hunter say, that *cold* is suited to the *feeble power* of life; or with John Brown, that cold is but the absence of a certain portion of heat, and is therefore a stimulus adapted to the *accumulated irritability* of the fibre. Undoubtedly, the method above stated is universally practised throughout the north, even with the *common people*, and with *constant success*, where respiration has not been suspended above an hour*. This is an *argumentum crucis*, that all parties must ultimately acquiesce in, however they may choose to *explain the fact*.

The fact has otherwise been attempted to be explained. The celebrated Kerr was rendered insensible by the fumes of charcoal. Water was poured over him, when he immediately revived. He supposes that the water was decomposed, and its oxygen penetrated the pores, or was absorbed, and stimulated the heart immediately into action. Vide Kerr's Chemical Dictionary, a work, to use the emphatic praise of Dr. Darwin, of such value as to outweigh the consideration of the loss of the Alexandrian library.

* Vide Dr. Pothergill's *Enquiry into the Suspension of Vital Action in Cases of Drowning and Suffocation*, page 136, a work which cannot be sufficiently praised for its great ingenuity and candour.

S E C T. IV.

OF ASPHYXIA FROM HANGING.

As hanging and drowning occasion death by preventing the access of air to the lungs, and the expulsion of the effete, and fixed, airs, it may not be improper to introduce these subjects here.

If death was nothing, and *nought* after death;
 If when men dy'd, at once they ceas'd to be,
 Returning to the barren womb of nothing,
 Whence first they sprung -- Then might the wretch
 That's weary of the world, and tir'd of life,
 At once give each inquietude the slip,
 By stealing out of being, when he pleas'd,
 And by what way; whether by *kemp*, or steel.
 Death's thousand doors stand open.—Who could
 force

The ill pleased guest to sit out his full time,
 Or blame him if he goes?—Sure he does well
 That helps himself, as timely as he can,
 When able.—But if there's an *hereafter*,
 And that there is, CONSCIENCE, uninfluenc'd
 And suffer'd to speak out, tells every man;
 Then must it be an *awful thing TO DIE*:
More horrid yet, TO DIE by one's own hand.
Self-murder!—dreadful deed!—our island's shame;
 That makes her *the reproach* of neighbouring states.
 Shall

Shall NATURE, swerving from her earliest dictate,
Self preservation, fall by her own act?
 Forbid it heaven!—Let not, upon disgust,
 The *shameless head* be foully crimson'd o'er
 With blood of its own Lord.—Dreadful attempt!
 Just reeking from *self-slaughter*, in a rage—
 To rush to the presence of OUR JUDGE;
 As if we challeng'd him to do his worst,
 And heeded not his wrath.— BLAIR.

From what has been already observed, it seems evident that whether death is brought on by *submersion*, or *noxious air*, the effect, produced on the animal body are so nearly *similar*, that these several modes of death may not improperly be referred to the *same common cause*. But with respect to the effects of *hanging*, most authors have inclined to the title of APOPLEXY, and this is much insisted on by Drs. Cullen and Boerhaave, and of late by Mr. KNE, and as a *difference in the way* cannot but *influence the result*, it therefore demands the most serious investigation.

It is observable that in APOPLEXY the irritability continues several hours,—while in *drowning* or *hanging* the animal functions are abolished in a few minutes.

In APOPLEXY, respiration, together with the action of the heart and arteries, go on, and the pulse often vibrates more forcibly than in health.—In HANGING, or DROWNING, respiration is suppressed, and the pulse obliterated.

In

In apparent death from APOPLEXY, very few recover, and those few generally become paralytic.— In vital suspension from DROWNING or HANGING, many are restored, and yet no palsy supervenes.

In cases of *apparent death*, an APOPLEXY indeed may *sometimes* occur, not as a *certain consequence*, but as an *accidental circumstance*. Thus in HANGING, if the person shall leap from an height to accelerate his death, it may produce a dislocation of the vertebrae of the neck, or an extravasation of the brain. Thus in DROWNING, if the person shall have fallen from any height, and receive a contusion on the head, and yet after all life be restored, it is no wonder if PALSY supervenes, a circumstance, however, by no means frequent in other cases of restoration from apparent death.

In a word, the two cases, upon the first view of things, appear to be *totally different*, and to require a *very different mode of treatment*.

In the *latter*, copious bleeding affords the principal relief; in the *former*, it generally proves highly injurious.*

The *wind-pipe* of a dog, says a very acute and ingenious experimentalist, Mr. Coleman, was secured

* In March 1781, the MEDICAL COMMITTEE entered their *Concave* against the use of the lancet.

— Si Pergama dextra

Defendi possent, etiam hac defensa fuissent. VIRG.
Vide Mr. Kite's laboured *Essay on the Recovery of Persons apparently drowned*, to which was given the *silver medal*.

PROPTER *crullianum* DISSERTATIONEM DE RESUSCITATIONE.

by

by a ligature at the instant of inspiration; in less than *four minutes* he ceased to struggle. Here there was *no obstruction* to the passage of the blood through the lungs, and *no accumulation* was found in his head; yet he died in this short space of time.

We next secured, says he, the two carotids * of a dog (which we know, from the experiments of Mess. Emmettus and Kite, may be done without materially injuring the functions of the animal). In half an hour after this operation he was hanged. In less than four minutes he ceased to move. The vessels of the brain, upon accurate inspection, were much *less distended* than in *ordinary death*. Here the principal supply being cut off, instead of the vessels of the brain being in a state of *congestion*, they contained a much *less quantity* of blood than *natural*, and consequently, *no* species of APOPLEXY could follow *from distention*, and yet this animal died *as soon* as others which had undergone no such operation †.

The following experiment, which was made by that eminent anatomist and teacher at Edinburgh, Professor Munro, is, we think, decisive on this subject.

A dog was suspended by the neck with a cord; an opening having been previously made in the wind-pipe below the cord, so as to admit air into the lungs. In

* Examine the Map of the Heart, Vol. I.

† Vide Mr. Coleman's excellent *Dissertation on Suspended Respiration*, a work replete with ingenious experiments, and honoured with the gold medal.

this state, he was allowed to hang three quarters of an hour, during which time the circulation and breathing went on without being much interrupted by the experiment. The cord being now shifted below the opening into the wind-pipe, so as to intercept the ingress of air into the lungs, the animal was completely dead in a few minutes.

Now, admitting these facts, is not the conclusion obvious, viz. *that in cases even of HANGING, death is not occasioned by a CONGESTION OF BLOOD in the brain; but from the want of the VITAL PRINCIPLE in the blood derived from the air?*

For the Plan of Treatment we must therefore refer the reader to what will be delivered in Section VI. on the recovery of drowned persons.

S E C T. V.

OF THE INSTITUTION OF THE HUMANE SOCIETY
FOR THE RECOVERY OF PERSONS
APPARENTLY DEAD.

Since no one from the prince to the peasant can at all times be secure from those dreadful disasters, which suddenly suspend vital action; and since medical practitioners themselves are by no means exempt; it surely becomes them to use every exertion to *improve the art of RESTORING ANIMATION*. May each progressive step in this interesting path of science tend to that great object! And may every laudable attempt, undertaken with that benevolent view, enable us with *more certainty to preserve life, and to diminish the sum of human infelicity!*

Dr. FOTHERGILL.

WHAT transport must it afford every compassionate bosom, to be instrumental in recalling an helpless fellow-creature from an untimely grave;—to witness, at that critical juncture, the heartfelt passions of anguish and despair, of hope, fear, surprise, and joy, which alternately agitate the human frame;—to mark the lively traits of gratitude painted in the countenances and deportment of the mother, sisters, brothers, &c. of the restored object!—What epicure could ever yet boast so refined, so exquisite a luxury as the benevolent deliverer must experience from such a scene;—a scene far beyond what any

pen as yet hath been able to describe, or pencil to express.

Previous to the origin of this new branch of healing (which indeed constitutes a *remarkable era* in the science of physic), death apparent and absolute had long been considered as almost synonymous terms. For the subjects of both, appear to have been alike consigned to the silent mansions of the tomb, without its being ever dreamt, that such a vast proportion of the former might, by a few simple means, have been recalled to life, and all the endearments of social happiness.

Of the truth of this important fact, the Transactions of the HUMANE SOCIETY have afforded the most ample demonstration. Little did any man think, not even the founders of this society themselves, inflamed as they were with sacred zeal, that, in the year 1794, there should be recorded 3000 instances, wherein the society's aid had been extended, two thirds of which had proved successful.

No sooner had the HUMANE SOCIETY surmounted the first difficulties inseparable from a novel undertaking, than it not only fixed the attention of the medical faculty, but also attracted the notice of the poet, the painter, the philosopher, and the divine. By such collateral aid, but still more by the uncommon exertions of ONE INDIVIDUAL, has this institution at length happily silenced all objections, triumphed over prejudice, and diffused its benefits.

benefits over a considerable part of the known world*.

The reader will instantly recollect, that the individual is no other than Dr. LETTSOM, to whose unremitting zeal and activity, aided by Dr. FLAWES and a few other such congenial characters, this society owes its existence. The latter, undoubtedly,

* Gentlemen, says Dr. Lettsom (addressing himself to the members of the *Humane Society*, assembled together to see presented their HONORARY MEDAL to Dr. Fothergill for his Prize Essay on the *Suspension of Vital Action*), I cannot resist calling your attention at this moment to the establishment of an *Humane Society* under our auspices at ALGIERS. I repeat ALGIERS; for it is surprising, and almost incredible, though indeed we know it as a fact, that in that barbarous soil a spark of humanity is at length kindled! What a grateful contrast does this present of the Christian system to the barbarity of infidels: In that land, where a Muley Ishmael immolated with his own hand eighty of his relatives, the amities of the Gospel have led to an establishment that saves the life even of a stranger! Those who can recall the commencement and origin of *this institution*, and the state of knowledge at that time, and should next survey the *present accumulation*, must experience singular pleasure in tracing the *progress and evolution* of SCIENCE as connected with the subject of the *resuscitative art*, much of which must be ascribed to the *disquisitions* which have resulted from the HONORARY PREMIIUMS. I do not speak my *own opinion* merely, but that of *Europe*, for in almost every medical work of character, there are appeals to their judicious authorities as decisive of the facts, which they have established, enforced, and illustrated. Of this kind is the *valuable production*, which has, at this time, brought together so many of our members and friends in the cause of active humanity.

was the first, in this country, who undertook to deliver a course of lectures on SUSPENDED ANIMATION, which was no easy task at that early period. He also was the first who proposed *honorary premiums* for the further elucidation of the subject. To him, as the ever active agent, may, in a great measure, be applied that emphatic expression of the celebrated Linnæus, who on witnessing the superior activity, zeal, and energy, which distinguished London, beyond every other city he had visited, exclaimed with rapture,

“PUNCTUM VITÆ IN VITELLO ORBIS!”

If such has been the progress of the present institution in its early stages, what may not be expected, says Dr. FOTHERGILL, now that PHILOSOPHY holds up the torch to Medicine, to illumine its votaries, and direct their course in this new path of science! A science, no less difficult, than it is sublime and important; involving at once the most intricate problems, in physiology, pathology, chemistry, and pneumatic philosophy!—Calculated not less to exercise the keenest faculties of the head, than to interest the finest feelings of the heart!

SECT. VI.

JOHN HUNTER'S PROPOSALS FOR THE RECOVERY
OF DROWNED PERSONS.

I CONSIDER an animal, apparently drowned, as NOT DEAD; but that only A SUSPENSION OF THE ACTIONS OF LIFE has taken place. I might compare the situation of such a person to that of a person in a *trance*. In both the action of life is suspended, without the powers of action being destroyed.

Drowning may therefore be defined to be, *a stop put to the actions of life in the animal, but without any irreparable injury to any vital part;—which action, if not restored by art in a certain time, is irrecoverably lost.*

The cessation of motion from drowning seems to arise from the loss of *respiration*, and the immediate effects which this has upon the other vital motions of the animal, except what may have arisen from the agitation of the mind, however the privation of 'breathing appears to be the *first cause*; and the heart's motion ceasing, to be the second or consequent; therefore most probably the *restoration of breathing* is all that is necessary to restore the heart's motion; for if a sufficiency of life still exists to produce that effect, we may suppose every part equally

ready to move the very instant in which the action of the heart takes place, their actions depending so much upon it.

What makes it very probable, that in recovering persons drowned, the principal effect depends upon air being *breathed into the lungs*, is, what happens in the birth of children, when too much time has been spent after the intermission of that life which is peculiar to the fetus: they then lose all order of the disposition for new life, and in such cases, were being a total suspension of the actions of life, the infant remains to all appearance dead, and would in fact die, if not *breathed into its lungs*, by which means the action of the heart is established.

To put this to the test, I shall give the result of an experiment, which I made in the year 1755.

A pair of bellows were provided, constructed in such a manner, that one person to throw fresh air into the lungs, and by another to suck out again the air that had been drawn in by the former, without mixing them together.

The muzzle of these bellows was fixed into the windpipe of a dog, and by working them he was kept perfectly alive. While this *artificial breathing* was going on, I took off the sternum of the dog, and exposed to view the heart and lungs. The heart continued to act as before, only the frequency of its action was considerably increased. I then stopped the motion of the bellows, and the heart became

became gradually weaker and less frequent in its contraction, till it left off moving altogether. By renewing my operation, the heart began again to act, at first very faintly, and with longer intermission; but by continuing the *artificial breathing* its action became as frequent and as strong as ever. I observed that every time I left off working the bellows, the heart became extremely turgid with blood, and the blood in the *left side* became as DARK as that on the *right side*: both sides of the heart having the SAME COLOURED BLOOD *, which was not the case when the bellows were working.

This situation of the animal appears to me exactly similar to drowning †.

Before

* Please to compare the Plate on the opposite page with the *Map of the Heart* in Vol. I.

† This experiment by John Hunter was very near related to that made an hundred years ago by the ingenious Dr. Hook. After he had laid open the thorax of a dog, he cut away the ribs and diaphragm, and removing the pericardium, he kept the animal alive for the Royal Society above an hour, by blowing fresh air into his lungs with a pair of bellows. It was observed, that as often as he left off blowing, and suffered the lungs to collapse, the dog presently fell into dying convulsive motions, and soon recovered again on renewing the blast.—After he had done this several times with like success, he pricked all the outer coat of the lungs with the slender point of a lancet, and by a constant blast made with a double pair of bellows he kept the lungs always distended, and without motion, and it was observed that

Before I offer my sentiments on the method of treating persons who are apparently drowned, it may be necessary to state *three Data*.

- 1st. So long as the animal retains the *power*, though deprived of the *action of life*; the cause of that privation being removed, the animal recovers.
- 2d. It is necessary to mention, that I consider the *living principle* as inherent in the BLOOD, and derived from the AIR, viz. *that principle* which prevents the corruption of the body, and is the cause of all its actions.
- 3d. The last proposition I assume as granted is, that the *stomach* sympathizes with every part of an animal, and that every part sympathizes with the stomach; therefore whatever acts upon the stomach, as a cordial, or rouses its natural and healthy actions, and on the contrary whatever affects it, so as to produce debility, has an immediate effect upon every part of the body.—FONTER.

while the lungs were thus kept distended with a constant supply of fresh air, the dog lay still, his eyes were quick, and his heart beat regularly; but that upon leaving off blowing, and suffering the lungs to subside, the dog presently fell into dying convulsive motions, and as soon recovered again on renewing the blast, and supplying the lungs with fresh air.

These proposals were first published in the Philosophical Transactions, and afterwards in his work on the Animal Economy; but, as John Hunter often lamented, he made *no converts!*

PROP. I.

When assistance is called in, soon after the immersion, AIR blown into the lungs may be *sufficient* to effect a recovery. The DEPHLOGISTICATED AIR *, described by Dr. Priestley, may prove more efficacious than *common air*. It is easily procured, and may be preserved for any length of time in bottles.—HUNTER.

To restore a person from a temporary suspension of vital action, is within the province of the physician; but to restore life, after it has entirely vanished, is an act of Omnipotence, and belongs only to HIM, who gave it.

The former is merely to rekindle the flame of a taper, by gently fanning the ignited wick: the latter, to reanimate a corpse, after the vital spark is totally extinct.

From the effects of VITAL AIR,

- 1st. In giving a *florid colour* to the blood,
- 2d. In generating *animal heat*,

* As the doctrine of *phlogiston* is nearly exploded, *this gas* will be now better understood by the term OXYGEN OF VITAL AIR.

we mean, why, in suspended respiration, the lungs cease to expand, and the blood to be changed in that organ, the heart ceases to contract, the arteries to vibrate, and finally, why the machine, though bound and at rest in all its parts, yet on a sudden, like a clock whose *pend. hour* is stopped, remains entirely at rest. In the latter, if we move but the pendulum, the wheels are immediately put into motion, and the clock again correctly marks its hours and minutes as before: so likewise in the animal machine (for such is the harmonious consent of parts,) that if motion can but be renewed in one of the principal organs, it is directly communicated to the next, and from thence to all the rest.

Thus, if the lungs expand, and the blood imbibes the VITAL AIR, the heart recovers its action, the brain its energy, the nerves their sensibility: the grand obstacle once removed, and the subordinate springs of life presently resume their respective movements.

From the privation of VITAL AIR in drowning, we can now explain, why the blood grows dark, the lips and countenance livid, and why the body loses its native heat; since, by renewing respiration, circulation is renewed, and the blood, having regained its florid colour, all these symptoms soon disappear.

The primary object, therefore, in the suspension of vital action, is to institute *artificial respiration* till the *natural breathing* can be re-established.

Those,

Those, who attribute the efficacy of this process to the mere mechanical expansion of the lungs, for the easier transition of the blood, regard not the quality of the air; nay some even have the folly to contend, that air blown warm from the lungs of a healthy person is better than atmospheric air.

Others deny that air, already vitiated by respiration, can be fit for the purpose (to say nothing of the indelicacy of the operation), and therefore justly prefer atmospheric air.

Being among the first, says the illustrious Dr. Fothergill, who recommended VITAL AIR in preference to the other two, not only from theory, but *actual experiment* on some of the smaller animals, I am happy to find its superiority has since been confirmed by many respectable writers both at home and abroad.

Nor is this to be wondered at, he adds, seeing it possesses every necessary quality of common air, in a super-eminent degree, and is alone capable of producing that chemical change in the blood, upon which *vital heat* and *irritability* depend. For during the suspension of respiration, agreeable to what has been before hinted, the blood loses its florid colour, from being deprived of the VITAL PART of the atmosphere. The animal heat is diminished, and the action of the heart grows suddenly weaker every moment, until at length it ceases altogether.

In the act of drowning it is also well known, that though suffocation generally takes place after a full expiration, that from 50 to 100 cubic inches of air still remain in the vesicles of the lungs. This stagnant air must therefore be highly vitiated, and therefore injurious to life; it cannot be evacuated by pressure, much less meliorated by similar air conveyed from another person's lungs; it may however be corrected by atmospheric air, and completely restored by VITAL AIR.

On the whole, it seems reasonable to conclude, that in the treatment of drowned persons, respired air must be less proper than atmospheric, atmospheric than VITAL; and could the latter be as easily and cheaply procured as the two former, few persons could hesitate a moment in determining which of them they ought to prefer.

Whence is it then, that the use of VITAL AIR has hitherto been withheld from the human species, and confined to a few experiments on brute animals?—Because it is even yet but little known; and its virtues less understood.—A remedy rarely to be had when most wanted, and never without some trouble and expence. But we may soon, however, expect some decisive experiments on this head, now that the VITAL AIR has not only unfolded the theory of respiration, digestion, and the animal heat, but also explains many other curious phænomena both in health and disease, and has been prosecuted with such uncommon ardour, as to give birth

birth to some of the most brilliant discoveries that shed lustre on the present æra *.—Dr. FOTHERGILL.

PROP. II.

It frequently happens in the case of drowning, that assistance cannot be procured till a considerable time after the accident; every moment of which delay renders recovery more precarious, the chances of which are not only diminished in the parts where the first powers of action principally reside, but also in every other part of the body.

If a considerable time, such as an hour, has been lost, it will seldom be *sufficient* to inflate the lungs with air; the heart having by this time lost its nice connexion with the lungs.

It will be necessary, having first inflated the lungs, to apply *volatile salts* to the nose. It will be better if it be applied up both nostrils, as such applications to the *olfactory nerves* are known to rouse the living principle and put the muscles of respiration into action, and are therefore likely to excite the action of the heart. Besides the salt of *vinegar*, the steam of the same may be employed, for affections of those nerves greatly affect the living principle, for while a strong smell of very sweet flowers, as

* After each proposition from John Hunter, we shall enlarge from the Prize Essay of Dr. Fothergill on the Suspension of Vital Action, or from the Rev. Mr. Townsend's Guide to Health.

orange-flower, shall in many cause fainting, the application of *vinegar* will immediately restore the powers to action again. Thus all perfumes in which there is some *acid*, rouses rather than depresses, as the sweet-brier, essence of lemon, &c.—HUNTER.

PROP. III.

Electricity has been known to be of service, and it is probably the only method we have of immediately stimulating the heart; all other methods being more by sympathy.—HUNTER.

The effects of electricity were, some time ago, finely illustrated by the ingenious Abildgard, in many curious experiments on apparently dead animals; wherein, by a dexterous management of its power, he is said to have been capable of alternately suspending and restoring animation at pleasure. The experiments have since been repeated by an eminent electrician * in London, and with similar effects. On smart shocks being passed through the head, the animal immediately becomes motionless; on transmitting the gentlest vibratory shocks through the region of the heart, oscillations of the external muscles instantly ensued.

When the operation was suspended for some minutes, or its duration altered to more remote parts, the animal relapsed into its quiescent state, and constantly revived on its being repeated as at first.

* Mr. Parryington.

And what is very worthy of attention is, the vital organs were more certainly excited, and more vivid motions produced by light, than when the shocks were increased; the latter appearing to retard, rather than promote recovery. It was also found, by the last experienced electrician, to afford present relief in syncope, though when administered with violence in people of a nervous habit, it is known frequently to produce that state.

From the above phenomena it seems reasonable to conclude, that electricity ought to be principally directed to the heart, lungs, and diaphragm, in the form of *gentle shocks*. Applied in a moderate degree, it excites vital action after other stimuli have ceased to act: carried to an extreme, it destroys irritability, and life itself. For whether the stroke be sent from a thunder-cloud, or a highly charged electrical battery, is immaterial; the effect from either may alike prove fatal. Electricity, therefore, presents us with one of the most powerful stimulants hitherto discovered, which, like other active remedies, may be *salutary or injurious*, according as it is managed. Hence the impropriety of those violent shocks of electricity formerly given in palsy, chlorosis, &c. which, like other exhausting stimuli, not only defeat the intention, but prove extremely injurious. Hence, perhaps, the surprising success of electricity in some cases that appeared desperate; and its failure in others, after it had produced some flattering tokens of recovery. Instances of both

which

which are to be met with in the Reports of the *Illmans Society* for the years 1787 and 1789. Nor is this to be wondered at, seeing its effects may be so greatly diversified according to the different modes of application, by which its powers are adjusted. Thus it may be directed to pass silently along the metallic wire; to melt it instantly; or disperse it with incredible fury. Thus a violent blast of air extinguishes the burning taper, while a gentle breeze rekindles it. In like manner, the tickling the soles of an infant causes convulsive laughter; while rubbing that part produces no such effect.

As it is known from various observation, that the blood passes most freely through the pulmonary vessels, when the lungs are expanded by a full inspiration; if at this juncture, the heart can be excited to exert its power, while the resistance is so considerably diminished; it must more easily propel the blood forward, when part of it will enter the left cavity, now almost empty. This being brought into action, will, in its turn, urge it forward into the arterial system.

As soon as the lungs, therefore, are fully expanded with air, and the more pure this is, undoubtedly the better; at that moment, let the heart be excited by a gentle electrical shock, passed obliquely from the right side of the chest through the left, in the direct course of the heart, and pulmonary vessels. Let the lungs be now emptied of the air, and again expanded,

expanded, when another shock may be given. The heart being thus excited into action, the *black blood*, loitering near its right cavity, will begin to move forward, and to resume a more *florid colour*. This being gradually renovated, will renew the action of the left auricle, where the circulation will also be speedily restored, and that, perhaps, with more certainty and expedition, than by the usual mode of conducting the operation.—Dr. FOTHERGILL.

PROP. IV.

It will be necessary to convey some stimulating substance into the *stomach*, to rouse this seat of universal sympathy. This operation should be performed with all possible expedition, because the instrument, by continuing in the mouth, might produce sickness, which would tend rather to distress than rouse the living principle.

The process recommended under the first head of treatment should still be continued, while those under the other heads are putting into practice; for I considered these only as auxiliary to the first. The first, in many cases, may succeed alone; but the other injunctions without the first must, I think, always fail where the powers of life are considerably weakened.—HUNTER.

When the heart has once been made to receive the *florid blood*, it will be stimulated to new action, and the vital functions will be restored. It will

will not, however, be sufficient to stimulate the *heart* and *lungs*; we must at the same time stimulate the *stomach*. Clearly to comprehend the purpose of this operation, the reader should be previously well acquainted with the discoveries of modern chemists. I have said wine must be conveyed into the stomach; but he should not be satisfied with being guided by the hand, without understanding the reason why such an application is attended with success. In the use of medicines he should endeavour to ascertain their mode of operation; for while the rash empiric wanders in the dark, the cautious and rational practitioner will be anxious to investigate the path of nature, and to account for her proceedings while he ventures to prescribe. I shall attempt therefore to throw some light upon a subject which is new, and therefore little understood.

It is well known from chemistry that, in nature's laboratory, the juice of the grape is composed of three ingredients.

- | | |
|---|--------------|
| { | 1. HYDROGEN, |
| | 2. OXYGEN, |
| | 3. CARBON. |

By the process of distillation, the HYDROGEN is separated in a great measure from the OXYGEN and CARBON, and we obtain what is called *alcohol* or *brandy*.

Alcohol itself contains some oxygen, but by combustion, it takes to itself still more from the atmospheric air, and thus by experience is found, that

15 ounces of alkohol, by combustion, produces 18 ounces of pure *water*.

The combustion here is nothing else but the combination or chemical union of HYDROGEN with OXYGEN, from which results a third substance *water*, whilst the HEAT which was before in combination with the oxygen escapes.

PILATRE DE ROZIER has frequently amused his friends by inhaling a large quantity of HYDROGEN AIR, which may be taken into the lungs without fear of injury, and then applying his mouth to a tube, he blew out the air unmixed with atmospheric air, and fired it at the end of a tube, so that he appeared to breathe *flame*. By this operation water was produced, which ascended in the form of vapour.

In order to give a distinct idea of the quantity of heat arising from the combustion of HYDROGEN AIR, I shall only mention that one pound of this melted 295 lb. of ice, whereas in similar circumstances wax candles * weighing one pound melted only 133 lb.

* These observations I have presented to the student, in order to give him a clear and distinct idea of the substances which I have had occasion to mention; by which he will see the strong affinity and chemical attraction between HYDROGEN and OXYGEN, the latter of which, as I have stated,

* ~~Fixed~~ fixed air (carbon and oxygen).

is by the *lungs* derived from the atmosphere, whilst the former is conveyed into the system by the assistance of the *stomach*, and is most readily obtained from æther, alkohol, and wi.

So much for what has been discovered by the chemist with his retorts. But it is time that we should return to the living retort, and consider by what laws the proportions are established between the OXYGEN to be derived by inspiration from the atmosphere, and the HYDROGEN to be conveyed into the system by the action of the stomach.

The reader, no doubt, calls to mind the memorable experiments of Mr. Spalding, who observed, that in proportion to the quantity of food received into the stomach, if it abounded with HYDROGEN, the system coveted OXYGEN, taking up a greater quantity of it by respiration from the atmosphere, as his diving-bell clearly demonstrated; and he will also remember having met with this remark in the case of bilious autumnal fever,

*"The attentive observer will take notice, that there is
 "a certain proportion between the VITAL AIR re-
 "ceived into the lungs, and THE QUANTITY
 "OF FOOD which can be digested in the sto-
 "mach."*

When I made the last observation I was not aware that the same had occurred to any one before me. But I have the pleasure to see the same idea had also occurred to Dr. Thornton, as appears in his *Thesis*, and to Dr. Beddoes, as is seen in his

Letter

Letter to Dr. Darwin. He had been breathing air, such as contained almost equal parts of OXYGEN and AZOTIC AIR. "His spirits were in consequence elated; his appetite great; and he ate one third or one fourth more than before, without feeling his stomach loaded."

From these premises I trust it will be clear, why, in cases of suspended animation, we must not be contented merely with conveying VITAL AIR into the *lungs*, but must at the same time convey HYDROGEN into the *stomach*, which powerfully attracts this substance so essential to vitality.—From the Rev. Mr. TOWNSEND'S *Guide to Health*.

In time of health, cordials, on being received into the stomach, presently manifest their enlivening effects: even before they can have time to enter the lacteals, their stimulus is diffused through the remotest parts of the system. In order, therefore, to restore the motion of the heart, through the medium of the stomach, some active cordial ought to be early administered. This having been considered by the faculty as unsafe, if not wholly impracticable, until the power of swallowing should be restored, it has hitherto on that account been very rarely attempted. Fortunately, however, we can now with confidence assert, that instead of waiting for the return of deglutition, an event which may never happen, fluids may at the beginning be

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immediately conveyed into the stomach, without occasioning the smallest hazard of suffocation.

Amongst the class of internal stimulants, spirituous liquors, as rum, brandy, or usquebaugh, are well adapted, as being speedy in their operation: but the exhausting effect which succeeds the action of these, and all other potent stimuli, tends to limit their use, and demands no small circumspection.

Good wine, where it can be had, though less active, affords a more generous cordial, and seems to deserve the preference; for during vital suspension, *irritability* must be considerably *accumulated*. Hence the necessity of artificial stimuli to compensate for the defect of the natural ones in carrying off the *redundancy*. But if these are too powerful, they may prove equally destructive, by totally exhausting the moving fibres. Thus may the salutary efforts of nature be overpowered by the officiousness of art, a circumstance which sometimes we have had occasion to observe with regret.—Dr. FOTHERGILL.

PROP. V.

While these things are going on, viz. the INFLATION of the *lungs* and STIMULATION of the *heart*, an assistant should carefully *beat* the bed-clothes. I consider *beat* as congenial to the living principle.

But

But from observations and experiments it appears to be A LAW OF NATURE in animal bodies, that the *degree of external heat* should bear *proportion* to the *quantity of life*; as it is weakened, this proportion requires great accuracy in the adjustment; while greater powers of life allow a greater latitude.

I was led to make these observations by attending to persons who are *frost-bitten*; the effect of cold in this case being that of lessening the living principle. The powers of action remain as perfect as ever, only weakened; and heat is the only thing wanting to put these powers into action; yet heat must at first be *gradually* applied, and proportioned to the quantity of the living principle; but as that increases you may increase the degree of heat.

If this method is not observed, and too great a degree of heat is at first applied, the person or part loses entirely the living principle, and mortification ensues. This process invariably takes place with regard to men. The same thing, I am convinced, happens to other animals. If an eel, for instance, is exposed to a degree of cold sufficiently intense to benumb it till the remains of life are scarcely perceptible, and still retained in cold of about 40 degrees; this small proportion of living principle will continue for a considerable time without diminution or increase; but if the animal is afterwards placed in a heat of 60 degrees, after shewing

from, signs of returning life, it will die in a few minutes.

If a lizard, or snake, be taken from its autumnal hiding place, and exposed to the sun's rays, or placed in any situation which would give vigour to the same kind, possessed of a larger share of life, they will immediately shew signs of *increased* * life, but quickly sink under the experiment and die; while others, reduced to the same degree of weakness, as far as appearances can discover, will live for many weeks, if kept in a degree of cold proportioned to the quantity of life they possess.

I observed many years ago, in some of the colder parts of this island, that when intense cold had forced blackbirds or thrushes to take shelter in out-houses, any of them that had been caught, and from an ill-judged compassion exposed to a considerable degree of warmth, died very soon. The reason of this I did not *then* understand; but I am *now* satisfied, that it was owing, as in other instances, to the degree of heat being increased too suddenly for the proportion of life remaining in the animal.

From these facts it appears, that warmth calls forth a great exertion of the living powers; and

* *Sedative powers*, says Dr. Brown, weaken the tone of the fibre, but by accumulating IRRITABILITY, *they* predispose the fibre to an *inordinate action* upon the application of a *slight stimulus*. How much does Dr. Brown's and John Hunter's doctrine then *coincide*, if we except the *difference of expression*!

that

that an animal in a weakly state may be obliged to exert a quantity of the actions of life sufficient to destroy the very powers themselves. Heat must therefore be carefully regulated according to the return of the powers of life, and must be adjusted accordingly.—HUNTER.

Heat is so essential to life, that without a certain degree of it, neither animals nor vegetables could subsist. The eggs of oviparous animals, the seeds of vegetables, and growing plants, discover, by the thermometer applied to their internal part, a degree of temperature evidently exceeding that of the circumambient atmosphere. Heat accompanies the embryo from the earliest period to the last stage of its existence, and therefore has been considered by some as the source of vitality. Hence, the fecundating egg brings forth in due season, whether the proper degree of heat be communicated by incubation, or by the temperature of a well-regulated oven. Hence, also, the myriads of animated beings, which, from imperceptible ova, are ushered into existence by the summer's sun. Hence dormant animals are roused from a torpid state, by the vernal warmth; and hence too, drowned persons have sometimes been reanimated by the solar rays.

From these, and similar considerations, it was very natural to conclude, that to restore heat to the body, must be one of the most powerful means of restoring animation. Accordingly, it has hitherto been attempted, by the application of artificial heat;

E. C. under

under an idea, that until this could be accomplished, every other means would prove ineffectual: without considering, perhaps, that an inanimate substance of such a bulk as the human body, containing a large quantity of matter under a small surface, must acquire heat very slowly: that to accomplish this in the internal parts (were it even practicable with safety) would demand great length of time, during which other measures no less essential must be postponed.

When *respiration* ceases in a drowned animal, the power of *generating heat* is suspended, and the body loses the remains of its natural warmth, till at length it is reduced to the temperature of the surrounding medium. During this, if we attempt to raise the heat suddenly to the natural standard, we exhaust the feeble remains of life. Nay, although we apply artificial heat by slow degrees, yet still, if no other means are used, it fails of success. But if we have first recourse to *artificial respiration* in the manner already described, the experiment will often succeed and produce the desired effect. The lungs being thus supplied with air, the blood is again rendered fit to receive a fresh supply of latent heat, and to diffuse it, through innumerable arteries and veins, from the centre to the circumference. Thus is the natural heat restored, and communicated to every part of the system, with more certainty and expedition, than by any external means that can be devised.

The

The most efficacious method of restoring heat, then, is to renew the *generating power*, by renewing *respiration*. For, till this natural process can be re-established, all that can be reasonably expected from the application of artificial heat, is to prevent the natural heat from being conveyed off; and to preserve sensibility and irritability, till the generating power can be renewed, on which they so intimately depend. Even in this view, it is a matter of considerable importance, and demands no small attention in the management.

Where the temperature of the body is considerably reduced, a small degree of additional heat will produce powerful effects. Hence with dormant animals that are torpid, a moderate degree of additional heat revives them; whereas a greater, even such as imparts vigour to them under other circumstances, speedily destroys them.

Thus nature instructs us that the artificial heat employed in restoring animation, ought to be very moderate; and the more so, in proportion as the natural heat is diminished.

If, at the lowest pitch of temperature, the application of snow, or cold water, affords a more safe and efficacious stimulus than artificial heat, is there not some reason to suspect, the cooling method might also prove preferable, at all the intermediate degrees?—That in drowning, for instance, where the temperature of the body, through exposures to extreme cold, is often reduced many degrees below

the standard, might not a momentary application of this method, at the beginning of the process, prove more salutary, than that sudden transition to artificial heat adopted by modern practitioners?

The heat might be augmented by degrees, and the person put between blankets, and flannels of tepid water, or flannels wrung out of the same, or in vinegar, might in some measure supply its place. These may be applied to the region of the stomach; to the arm-pits, to the groin; and to the extremities: their warmth being retained by a covering of warm flannel. The room should have no visitants to corrupt the air, its heat should be between 54 to 64 degrees of Fahrenheit's scale. But let it be ever remembered, that till the *generating power* can be restored to the frame, it is in vain that we attempt by these, or any other means, to raise the heat of the body to the natural standard.—Dr. FOTHERGILL.

PROP. VI.

Motion may possibly be of service, it may at least be tried; but, as it has less effect than any other of the above prescribed stimuli, it should be the last part of the process.

I would recommend to the operator the same care in regulating the *proportion* of every one of these methods, as I did before in the application of heat; as every one of them may possibly have the same property of entirely destroying the feeble action

tion which they have excited, if administered in too great a quantity; instead therefore of increasing, or hastening the operations on the first signs of returning life being observed, as is usually done, I would recommend their decrease, or that they be adjusted as nearly as possible to the powers as they arise. As the heart is commonly the *last part* that ceases to act (*ultimum moriens*), it is probably the *first part* that takes on the action of recovery. When it begins to move, I would advise the observing, with great attention, when the muscles of respiration begin to act, that our endeavours may not interfere with their natural exertions, and that we may co-operate with nature; and I would advise the breathing also, at this time, by degrees, the application of air to the lungs.—HUNTER.

Brisk *agitation* is best performed between two people; one taking hold of the patient's feet, while the other supports the shoulders, with the head properly elevated. This has of late been suspected of having a dangerous tendency, though apparently without any just cause. It certainly affords a safe and speedy mechanical stimulus to the whole machine, and may be executed in less than three minutes; producing all the advantages that could be hoped for from the action of an emetic, and without the danger.

The successive concussions thus communicate to the part and internal organs, tend to put the stagnant

nant blood in motion ; to renew oscillations in the moving fibres ; and to incite the hidden springs of life into action.

By brisk agitation still-born children have sometimes also been unexpectedly brought to life. Sometimes drowned persons have been restored by the same means.

Being a simple and harmless effort to restore animation, and easily performed by the lower class of people, it ought by no means to be discouraged. If it fails, it does no injury, unless it be performed with unnatural violence : if it succeeds, it supercedes the use of other measures.

A remarkable instance of recovery accidentally occurred some years ago, where a sudden jolt of a coffin is said to have disturbed the repose of the apparently dead lady within : who, to the surprise of the persons shoving the coffin, and utter confusion of her husband, instantly gave a piercing shriek ! This, being repeated in her usual shrill and well-known key, left him no room ~~to~~ doubt of his *cara sposa* being actually alive. It therefore obliged him, though very reluctantly, to counter-order the sepulchral ceremonies, and release the supposed corpse ; who, it is added, lived many years after, till at last she had the satisfaction of seeing her husband " peaceably inurned" in the very same spot intended for herself.—Dr. FOTHERGILL.

PROP. VII.

The steam of some *stimulating substances*, which are of a warm nature, should be employed as an enema.—HUNTER.

Not only the *stomach*, but the *intestinal tube* annexed, constituting the alimentary canal, is every where most bountifully supplied with nerves, by which an intercourse is carried on with all the principal organs, and propagated to the remotest parts, of the system. This canal, therefore, through its whole extent, may be well considered as the centre of sensibility and nervous sympathy; and consequently deserves particular attention in all cases of vital suspension. Hence various stimulants have been proposed for supporting its peristaltic motion, and for rendering it a proper medium for renewing nervous energy, by means of its sympathy with the other vital organs.

Forins of enema. 1. Take half a pint of Madeira wine; add ~~one~~ drachm of the tincture of cinnamon or lavender, or half a drachm of pure spirit of sal ammoniac.

Or 2. Take, of warm water half a pint, of fresh mustard half an ounce, of ethereal oil of turpentine two drachms. The whole to be incorporated with the yolk of an egg.

Or 3. Take of strong infusion of horse-radish root twelve ounces, of pure sal ammoniac one drachm.—DR. FOTHERGILL.

PROP.

PROP. VIII.

Friction, with agitation of the body, were the earliest methods employed for the recovery of the drowned; and still constitutes almost the only means known to the common people. Notwithstanding the rude unscientific manner in which they generally conduct the former operation, yet there are not wanting instances of its success, which probably would have been more numerous, had it been directed by more skillful hands.

Its general effects may be understood, from its stimulating the extremities of the cutaneous nerves, which sympathise with the principal internal organs. But still more, in the present instance, from its exciting the arteries to propel the blood into the corresponding veins, and from thence forward to the heart, while it favours the production of animal heat.

In order to render friction perfectly safe, and at the same time to give it its full efficacy, the following cautions may not be unnecessary.

1. Violent friction, in these cases, is generally unnecessary; it seldom can be useful; and it may often prove hurtful.
2. To obviate any danger that may arise from friction, artificial respiration, with electricity, ought in propriety to precede its use, that a free passage may be first opened through the lungs,

lungs, when friction may be safely pursued with more freedom.

3. Where, through want of skilful assistants, the previous process cannot be properly managed, the friction ought to be more gentle; beginning at the upper and lower extremities, where the circulation is always the most lingering, proceeding gradually to the thighs, abdomen, and chest; where it should be occasionally suspended, about half a minute at intervals, for the heart to evacuate itself.
4. Upon the whole, friction may be performed to the best advantage by the hands alone; the natural warmth of which will be communicated to the body, and gradually increased by the continued attrition.
5. Next to friction with the warm hand, the rubbing with a flesh brush may occasionally be had recourse to; or, what may prove still more advantageous, bare skins, or warm flannels, which may be well impregnated with the penetrating fumes of gum benzoin, kept in readiness in a state of fusion: besides its stimulating and gently bracing quality, which seem well adapted to the present purpose, this fragrant gum possesses a pleasant odour, which, instead of annoying, may prove grateful to the medical assistants, during their benevolent and truly meritorious exertions in the cause of humanity.—Dr. FOTHERGILL.

PROP.

PROP. IX*.

I would by all means discourage *blood-letting*, which I think weakens the animal principle, and life itself, consequently lessens both the power and disposition to action: and I would advise to be careful not to call forth any disposition that might depress, by introducing any thing into the stomach, which ordinarily creates *nausea*, as that also will have a similar effect. I would therefore avoid throwing up any enema, which is likely to produce an evacuation, as every such evacuations also tend to lessen the animal powers. I have purposely avoided speaking of the *fume of tobacco*, which always produce sickness or purging, according as they are applied.—HUNTER.

In concluding these proposals for the recovery of drowned persons, we would exhort the humane practitioner, and all others, to trust in God's mercy, and not to despair until every exertion has been duly employed.

LATEAT SCINTILLULA FORSAN,

should be constantly remembered upon every such melancholy occasion.

* Prop. IX. relates to what should be avoided: The medical committee, after the receipt of Hunter's paper, entered their caveat against *blood letting* in suspended animation, and the *fumes of tobacco* are getting fast out of fashion.

S E C T. VII.

A SUMMARY OF THE WHOLE DOCTRINE RELATIVE
TO THE RECOVERY OF DROWNED PERSONS.

Does not the union of judgments, viz. of JOHN HUNTER, Dr. GOODWIN, the Rev. Mr. TOWNSEND, Dr. FOTHERGILL, and Dr. CURRIE, indicate that we have reached to *some certainty* in the important and curious investigation relative to suspended animation?

HAVING thus impartially examined at some length the remedies employed for the restoration of suspended animation, and endeavoured to ascertain their merit with a view towards improvement; we proceed to reduce the method of conducting the process into a more compendious form.

In all cases of apparent death, time presses, and the urgency of the case demands uncommon expedition. In this critical situation, the *vital spark*, like the last glimmering of a taper, at each succeeding minute, grows more and more feeble, till the instant it expires! Every moment is precious to one who hangs, as it were, betwixt time and eternity.

To prevent delay, by which, alas! too many have already perished, proper HOUSES OF RECEPTION, supplied with the necessary APPARATUS, ought to be established at the expence of the parish, in every *market town* situated near lakes or rivers,

vers, and particularly in all *sea-ports* throughout the kingdom.

The overseers of the poor, church-wardens, and clerks of the several parishes, should be *instructed* in the means proper for the recovery of drowned persons: for the operation of inflating the lungs completely, demands considerable address; and as it constitutes the most important part of the process, it were to be wished, that not only medical pupils of all denominations, but also other intelligent persons, in every parish, were fully instructed how to perform it with dexterity.

Possessing the proper instruments*, the most efficacious measures should be immediately pursued by the assistants; not in hurry and confusion, but with method and regularity, conformable to a well digested plan.

As soon as the object arrives, all spectators should be excluded the room, except those that are absolutely necessary, and which perhaps never need to exceed seven in all, including the medical assistants.

A greater number will not only embarrass the operation, but render the air impure by their respiration, and the contaminated air of a crowded

* These may be seen at Savigny's, No. 23, King-street, Covent Garden, &c. They owe their improved state chiefly to Mr. Coleman and Dr. Currie, who have each obtained prizes for their able works on *suspended animation*. The former approximates to the doctrine exhibited in these pages; the latter exactly coincides with our opinion.

room, in cases apparently favourable, may defeat all hopes of success, as we have seen with regret in more than one instance.

If the weather will permit, the windows should be kept open, and temperature be regulated between 56 and 64 of Fahrenheit's thermometer.

If the season be perfectly serene, the body may be placed in the open air to receive the genial warmth of the solar rays, while the other necessary means of recovery are pursued.

The body, if wet, must be immediately well dried, to prevent the chilling effects of evaporation, and then be wrapped in warm blankets, or the warm clothes taken from some of the spectators, unless the cooling process should be first necessary, in consequence of the object being in a half-frozen state. For in that case, the body ought to be rubbed with snow, or flannels wrung out of cold water or vinegar, before any degree of artificial warmth can be safely applied.

Having prepared a bed or mattress, on a table of a proper height, the subject is to be placed thereon, with the head elevated by two pillows; when the different parts of the process may be conducted in the following order:

1. Let the lungs be immediately inflated by means of the proper instruments. When no medical assistant can be had in time, this operation may be tolerably performed, even by the common people, by only inserting the pipe

of a pair of bellows into one nostril, while the mouth and opposite nostril are closed by an assistant, and the windpipe gently pressed back. Then by forcing air into the lungs, and alternately expelling it by pressing the chest, respiration may be imitated. Or, upon an emergency, air may be blown into the lungs through a tobacco-pipe, a quill, or even a card folded into the form of a tube.

Not only this, but the rest of the process might certainly be performed without much difficulty by the common people, were they properly instructed; since it appears that, in Holland, more than half the recoveries of the drowned are brought about by them alone, though, at home, we know but few instances of this sort.

- 2^d. The electrical machine being prepared, and the lungs expanded, let one discharging rod be placed just below the right breast, and the other above the short ribs of the left, the electrometer being moved a quarter of an inch from the jar, let the electrical current be passed directly through the heart. The electrical shock being given, let the lungs be emptied by making an expiration with the double bellows, or by suffering air to escape by the mouth, while gentle pressure is made on the chest. The moment this is accomplished, let the lungs again be expanded, and the shock repeated,

peated, varying its direction, its power, and its frequency, as circumstances may point out.

3^{ly} Particular stimuli may next be applied to the organs of sense, as a strong light to the eye, and pungent substances to the olfactory nerves, especially the salt of vinegar.

4^{ly} These operations being carried on for five minutes, let the stimulating cordial be conveyed through the flexible tube into the stomach, by pressing the vegetable bottle in which it is contained.

Immediately after this, either of the stimulating enemata may be also properly administered, or, what would perhaps be preferable, warm VITAL AIR. The cordial, and enema, may, if necessary, be repeated near the close of the process.

6^{ly} These internal stimulants being given to provoke the action of the heart, bladders of tepid water should be applied to the region of the stomach, and to the extremities.

7^{ly} The legs and arms must be now diligently rubbed with the warm hand, or with flannel, or a hare-skin, impregnated with the fumes of *gum benzoin*. The friction must be gradually extended to the thighs, abdomen, and chest.

8^{ly} At that critical period, when sneezing, slight twitchings, or gasping, mark the first dawn of returning

returning life, instead of increasing, it will be prudent to moderate the stimulating powers.

9th. The process above mentioned should be continued the full space of three hours, with very few intermissions, unless the vital functions should be restored sooner. If, at the end of that period, the unfavourable symptoms, instead of diminishing, should increase, the case may be considered as utterly hopeless, and therefore the process may be discontinued. Still, however, before quitting the room, it may not be improper to order a strong blister to be applied to the region of the heart, and warm sinapisms to the feet, first sprinkled with the volatile alkaline spirit.

10th. When the natural respiration and the power of swallowing are restored, the patient should be put into a bed moderately warm, with his head properly raised, and his feet wrapped in warm flannel. Warm whey, and other diluents, may now be administered, to encourage a gentle perspiration. But he ought by no means to be left alone, till he has perfectly recovered his senses: some persons having relapsed, and afterwards perished, from being deserted too soon, even after the functions were apparently restored. Unhappy instances of this sort have been properly noted in the Society's Reports.

- 11^b. Should feverish symptoms ensue, accompanied with a sense of heaviness, or dull pain in the head or chest (as frequently happens in consequence of the severe discipline so lately undergone), moderate bleeding, together with mild laxatives and cool regimen, will generally afford the desired relief.

OUR
RELATIONSHIP
TO
DARKNESS.

SEC. F. VIII.

OF DARKNESS.

As a due degree of stimuli is necessary for the maintenance of firm health, we now see the reason why confinement in dungeons, independent of dampness, is so injurious to the health of prisoners: and why the meaner sort of houses in this country, since they have been *darkened* * in consequence of the heavy window tax, have been observed to exhibit a race of more pale and sickly inhabitants. Finally, why the *gloomy chambers* of the sick, labouring under atthenic diseases, are rendered more unwholesome, and acquire additional horrors, by indeliberately shutting out the cheerful beams of day: and why the effects of all diseases of this class are increased by thus imprudently depriving the patient of one of the most exhilarating cordials in nature.

* The fact was repeatedly noticed in his different journays by the philanthropic Mr. Howard; and it is notorious to every eye, that the servants who are stewed in dark chambers deprived of *fresh air* and the *morning light*, exhibit the most sickly appearance. It requires another Howard to point out the *evils* sometimes inadvertently inflicted by the *governors* on the *governed*, and to stir up HUMANITY in the cause of *suffering Nature*. It would be very easy in taxes to make proper exemptions, and garrets and poor people's windows should be wholly excepted from any tax.

That

That the *absence* of LIGHT accumulates IRRITABILITY in the fibre, is shewn from the following experiment.

I enveloped, says Girtanner, the leaves of the *mimosa*, or sensitive plant, in an opaque body, so that the air might have free access, while the light could not penetrate, and I found that all these leaves became *conspicuously more irritable* than the rest.

Animals deprived of LIGHT, or living in DARK PLACES, lose their colour and become *white*, as is observable in *arctic animals* during the long nights in the countries near the pole: I have observed it also in the animals that inhabit the *Aps*, and which conceal themselves the greatest part of the year in subterraneous dwellings. Mice kept in a cage in a very dark room produce *white mice*.

Blanched plants lose their green colour and become white, and are not then capable of supporting a great quantity of LIGHT. In the *white Negro*, born of black parents, exhibited in London, the hair was of a *silver white*; the eye had a ferrety appearance, and was so *impatient* of the *stimulus* of LIGHT, that it was almost in constant action. These accidental varieties in the human species are properly called *moon-eyes*, for they cannot endure the glare of light from the sun, and though they enjoy his reflected rays from the moon, they are not able to behold that luminary. The nose in this *white negro* was flat, exactly resembling that of a black,

black, and the lips were thick, and the skull prominent from behind. No doubt, therefore, remained of this woman having been born of negro parents *; and the person who showed it had attestations to convince the most incredulous. This variety of the human species has been particularly observed in three different districts of America. Their skin is covered with a fine hairy down of a *chubby white*; the hair of their heads, their eyebrows, and eye-lashes, are of the same hue. They

* She was at this time giving suck to an infant whose father was a white, but the child had all the appearance of a *mulatto*.

There is now at Exeter Change a man, born of black parents, who is black and white, directly *pie-balled*.

Q^U. *Query*. Would the TRADERS IN HUMAN FLESH feel some conscience in selling this *white* negro woman?

A^N. *Query*. On which side would the balance of opinion preponderate with them with regard to the *pie-balled* man?

It is melancholy to observe the pains some white men have been at to represent the *black race* as a lower species of animal, to confound them with the monkey; or if men, to degrade them into beings destined by a benevolent and superintending Providence to become the *slaves* of such as boast the names of *Christian* and *European*!

If they are uncivilized, it is you who have plunged them deeper in their darkness. If their country is unattractive, it was once the chief resort of Rome. If barbarous in the extreme, you have set them a still more barbarous example. And if it shall be said, that the 18th century was an enlightened period, your deeds will be adduced to disprove the assertion.

... are

are universally described by all travellers as a race of *low* STATURE, of a *feeble* MAKE, and *incapable* of enduring the *slightest* FATIGUE *.

Two temperaments, as they have been called, in physis, have been long observed. The external appearances of the *sanguine*, or *irritable* temperament, are these. The hair is soft, and never much curled, except in infancy, is of a pale brown colour, and from thence passing through the different shades from the auburn to the bright red, the skin is smooth, and white, and subject to freckle; the cheeks ruddy, the eyes most commonly blue, the habit of the body soft and plump; after the period of manhood disposed to obesity; the frame easily disturbed; and the mind sensible, and disposed to the alternate successions of mirth, and sadness, accompanying both with tears.

The other temperament is called the *dark*, or *melancholic*. In this the external appearances are the following. The hair is hard, black, and curled; the skin is coarser, and of a dun colour, the complexion running from all the shades of brown, until it arrives at a complete jet. The eyes are constantly black; the habit of the body rather meagre; strength considerable, mind slow, and disposed to seriousness, caution, and timidity, with but little sensibility, tenacious of emotions when once excited, and therefore revengeful.

* See Robertson's History of America.

If we consider the complexion of different countries, we shall find them dark in proportion to the nature of the climate. In general it may be asserted, that, as we approach the line, we perceive the inhabitants of each country grow browner until the colour deepens into perfect blackness. All Europe, almost the whole of Asia, and the temperate parts of Africa, are occupied by men of a fair complexion. All the torrid zone in Africa, some of the warmer regions adjacent to it, and a few countries in Asia, are filled with people of a deep black colour. If we trace the nations of our continent, making our progress from cold and temperate countries towards those parts which are exposed to the influence of vehement and unremitting heats, we shall find the extreme whiteness of their skin soon diminish, and its colour deepen gradually as we advance, and, after passing through all the successive gradations of shade, terminate in a uniform unvarying black. Thus, taking our standard from our own country, we find the French, who are more southern, a slight shade deeper than we; going further down, the *Spaniards* are browner than the *French*; the inhabitants of *Fez* darker than *they*; and the natives of *Negroland* the darkest of all *. The irritable principle in the fibre is also

* That the complexion depends solely upon climates is ably demonstrated by Dr. Smith. There are now Jews in Africa who observe all their religious ceremonies, and do not
of

found much to correspond with *those shades*. In all regions, however, the *children* are born *fair*, or at least *red*, and grow darker or black as they advance in life.

of course intermarry with the natives, yet they are completely black, no traces of the European features remaining. His arguments extend equally cogent throughout a whole octavo volume.

OUR
RELATIONSHIP
TO
COLD.

S E C T. IX.

OF COLD.

DURING the winter, by the absence of the stimulus of *heat*, and in part of *light*, plants and many animals become *torpid*, the organs of circulation, and of nutrition, perform their functions but languidly, and life itself appears suspended. In consequence of the *diminished action* of these stimuli, THE IRRITABILITY accumulates, and manifests itself at the return of *spring*. A slight degree of heat then produces powerful effects upon the fibres thus *delicately irritable*. Animals, which had concealed themselves under ground, even when the cold is greater than in autumn, venture forth from their subterraneous retreat, trees and plants put forth their leaves and blossoms, and birds, and animals, and man himself, is sensible of the stimulus of heat from the return of *spring*, his fibres being rendered *more irritable* by the winter's cold.

Dr. Hale, in his *Vegetable Statics*, relates that he cut-down a vine, and cemented to its mutilated stump glass tubes, each 7 feet long, and one fourth of an inch diameter, with brass caps, by which they were screwed on one above another, till they rose to the height of 36 feet.

By these gages it appeared,

- 1st. That the *sap* began visibly to rise MARCH 10, when the thermometer by day stood only at 3 degrees above the freezing point;
- 2^{dly}. That, APRIL 18, it was at its height and vigour;
- 3^{dly}. That from that time to MAY 5th the force gradually decreased;
- 4^{thly}. That it constantly rose *fastest* from sun-rise to about 9 or 10 in the morning, and then gradually subsided till about 5 or 6 o'clock in the afternoon;
- 5^{thly}. That it rose *sooner* in the morning after cool weather, than after hot days, and in proportion to the coldness of the night and subsequent heat;
- 6^{thly}. That after several successive cold days and nights, the sap would rise during the whole day, if it chanced to be fine, although shortest at noon.
- 7^{thly}. That if warm weather had made the sap flow vigorously, that vigour would be abated immediately by a cold easterly wind and a cloudy sun, when the sap would sink at the rate of an inch per minute: but when the sun shone out, and the wind shifted, it rose again as usual.
- 8^{thly}. The OLDEST VINES were *fastest* affected by a change of temperature, and in them the sap first began to sink.
- 9^{thly}. And, on the contrary, when the tube was fixed

fixed to a very short stump of a YOUNG VINE, and at only 7 inches from the ground, the sap flowed *incessantly*, and *fastest* of all, in the *greatest heat* of the day, *sinking* only after *sun-set* *.

He then makes this *general conclusion*, that the rapidity with which the sap circulates in the vine during *spring* is *five times greater* than the rapidity with which *the blood* flows in the *arteries* of a *horse*, that it is *considerably slower* in the *summer* than in *spring*, *very languid* in *autumn*, and *ceases altogether* in the *winter*.

The above experiments clearly demonstrate, that it is not from *heat* and *light* alone that the sap rises in the vine, for if that were the case it would *increase* as the heat increased. it would be greatest in the *noon-day* and in the *height of summer*, and *less* in *spring* than in *autumn*, whereas the reverse is here shewn to be the case. It must therefore depend on the *IRRITABILITY* of the fibre, which gets *exhausted*.

* This last observation is very valuable, and applicable to the *human frame*. If a child, or an old man take moderate portion of the strong stimulus of opium or wine, an *exhaustion* of the irritability of the fibre ensues, as was shewn before; but if the same quantity be given to a person in the vigour of health and life, it serves to call forth the irritability of the fibre without exhausting it, and the actions of life become increased, and sleep does not take place before the customary hour. This will be further illustrated when treating on the different effects of the cold-bath on strong and very weak constitutions. Vide page 98 of this volume.

by the stimulus of *heat and light*, and is *accumulated by its absence*.

In the same way the *IRRITABILITY* of the *bedysarum gyrans* is exhausted by the heat of the noon-day sun; and, according to the experiments of FONTANA, it is proved that the *IRRITABILITY* of the *sensitive plant* is *great in the morning, diminished during the heat of the day, and little or none in the evening*.

Hence it is that the return of *cold and frost* in the *spring* is so *noxious* to vegetables, and that this season is *forward* according to the severity of the preceding winter.

FONTANA observed, that during winter the *vipers* which he kept for his experiments were in a *torpid state*, though the thermometer was at 59 degrees. He endeavoured to render them vigorous by *warmth*, and exposed them to a heat of 67 degrees only. *In two minutes they died*, though during *summer* they bear a much greater degree of heat, without the *least injury*; but then they are *less irritable*.

SPALANZANI observed the *newts* bury themselves in the earth, and become *torpid*, in the month of *October*, before the thermometer in the shade falls to 54 degrees; and that they *re-appear* in the month of *February*, though at that time it freezes during every night, and not unfrequently during the day the thermometer is many degrees below 54.

"*What is the reason,*" enquires this excellent observer, "*that these animals revive in SPRING, when the*

the cold is more intense, and sink into torpidity at a much less degree of cold in the AUTUMN ?"

I will solve this problem, by observing that in AUTUMN a very great stimulus is required to act upon the fibre of these animals, *exhausted* as it has been by the heat of the summer; but in SPRING, the least stimulus, the least increase of heat, is sufficient to put the fibre into action, its *irritability* having *accumulated* during winter in consequence of the *absence* of the *common stimuli*.

Thus precisely is it with the *vegetable tribe*, for they *sleep* in winter, and are *awakened* by the vernal sun; but die, if too powerful a heat be suddenly applied.

On this principle, says the Rev. Mr. TOWNSEND, we may account for the destruction of plants by *blight* in summer; for unless there be *frost* at night there is no blight; and it may be remarked, that the blight does not take place during the action of the *frost*, but at the rising of a *cloudless sun*.

Hence it is that our garden crops, such as French beans and peas, which usually suffer most by blight after a frosty night in summer, suffer no injury if they are watered immediately before the rising of the sun, because the evaporation abates the heat.

The effects of winter are therefore very great in cold climates, because the accumulation of the *irritability* is in proportion to the abstraction of the stimulus of heat.

In Lapland corn ripens in 60 days, whereas in France it requires 120 or 160 days. The truth of what is here advanced may be proved by exposing vegetables *alternately* to *heat* and *cold*: it is surprising how much their growth and the power of vegetation is increased. But in these experiments care must be taken to vary the temperature by degrees; because the *irritability accumulating* in the fibre by the abstraction of the heat, a very small quantity of this stimulus *then* applied is sufficient to exhaust it entirely, or to destroy it.

PRACTICAL OBSERVATIONS.

S E C T. X.

OF ASPHYXIA FROM COLD.

THE advantage of clothing as fencing out the cold, or, in more philosophic language, as retaining the inbred, or vital, heat, has been before considered. We are now to contemplate the effects of the excess of cold.

If we look around the world, we shall be able to find not more than *five distinct varieties* in the human species, each of which is strongly marked, and speaks the kind seldom to have mixed with the other. The race we are at present about to consider are the men who are found near the *Pole*. These nations being under a rigorous climate, where the productions of nature are but few, and the provisions coarse and unwholesome, their bodies have shrunk to the nature of their food. These, therefore, in general, are described as a race of short stature *, and odd shape, with countenances as fa-

* They are usually about four feet high, and the tallest does not exceed five feet. GOLDSMITH.

vage as their manners are barbarous. Gustavus Adolphus once attempted to form a regiment of such men, but he found it impossible to accomplish his design; for it should seem, says Dr. Goldsmith, as though they were unfitted for any other climate, or mode of life, but their own.

In these inhospitable regions all is *torpid*. Here you see, in the greatest possible perfection, the *sedative power* of extreme and continued cold. Here no vegetable thrives except the *lichen*; and no animal but the *reindeer*. Nor is the extremity of cold less productive of the *tawny* complexion than that of heat. The natives of the *arctic circle* are all *brown*; and those that lie most to the north are of a *still darker hue* *. In this manner *both extremes* are *unfavourable* to the human form and colour, and nearly the same *debilitating effects* are produced under the *Poles* that are observed at the *Line*.

Ah! little think the gay licentious proud,
Whom pleasure, power, and affluence surround;
They, who their thoughtless hours in giddy mirth,
And wanton, often cruel, riot waste.

Ah! little think they, while they dance along,
How many feel, this very moment, death
And all the sad variety of pain.

How many sink in the devouring flood,
Or more devouring flame. How many bleed,
By shameful variance betwixt man and man,

* Cook's Voyage.

How many pine in want, and dungeon-glooms;
 Shut from the common air, and common use
 Of their own limbs. How many drink the cup
 Of baleful grief, or eat the bitter bread
 Of misery. Sore pierced by wintry winds,
 How many shrink into the fordid hut
 Of cheerless poverty.—Perhaps, the swain
 Hieing homeward to his family, now
 Disaster'd stands; sees other hills ascend,
 Of unknown joyless brow; and other scenes
 Of horrid prospect; bleach the trackless plain:
 Nor finds the river, nor the forest, hid
 Beneath the formless wild; but wanders on
 From hill to dale, still more and more astray;
 Impatient flouncing through the drifted heaps,
 Stung with the thoughts of home; the thoughts of
 home

Rush on his nerves, and call their vigour forth
 In many a vain attempt. How sinks his soul!
 What black despair, what horror fills his heart?
 When for the dusky spot, which fancy feign'd
 His tufted cottage rising thro' the snow,
 He meets the roughness of the middle-waste,
 Far from the track, and blest abode of man;
 While round him night resistless closes fast,
 And every tempest, howling o'er his head,
 Renders the savage wilderness more wild.
 Then throng the busy shapes into his mind,
 Of cover'd pits, unfathomably deep,
 A dire descent! beyond the power of frost,

Of faithless bogs; of precipices huge,
 Smoothed up with snow,* and, what islands un-
 known,
 What water, of the still unfrozen spring,
 In the loose marsh or solitary lake,
 Where the fresh fountain from the bottom boils.
 These check his fearful steps;—and down he sinks
 Beneath the shelter of the shapeless drift,
 Thinking o'er all the bitterness of death,
 Mixed with the tender anguish nature shoots
 Thro' the wrung bosom of the dying man,
 His wife, his children, and his friends unseen.—
 In vain for him th' officious wife prepares
 The fire fair blazing, and the vestment warm.
 In vain his little children, peeping out
 Into the mingling storm, demand their fire,
 With tears of artless innocence. Alas!
 Nor wife, nor children, more shall he behold,
 Nor friends, nor sacred home. On every nerve
 The deadly winter fever; thus up sent,
 And, o'er his inmost vitals creeping cold,
 Lays him along the snows, a stiff'ned corse,
 Stretched out, and bleaching in the northern blast*.

When, through exposure to extreme cold, the fingers, or other external parts of the human body, are frozen, the heat in these parts must necessarily be reduced to the lowest point consistent with life. If artificial heat be suddenly applied, a mortifica-

tion ensues, and the parts that have been *frost-bitten* drop off. But if they be thawed by friction with snow, and afterwards the gentlest warmth be then gradually applied, the parts are soon restored to their wonted use and activity.

When the state of torpor or apparent death is brought on, whether in the dormant animals, or man, whether by the sedative effects of cold, or by submersion, the phenomena are extremely similar. *Both* are bereft of SENSE and MOTION. *Both* lose a large portion of ANIMAL HEAT. *Both*, on their first recovery exhibit similar efforts towards restoring RESPIRATION and CIRCULATION. *Both* are restored by a gentle degree of WARMTH, and are destroyed by a HEAT too great, or too suddenly applied. Indeed the GRAND SECRET of the art of restoring *suspended animation*, consists in NICELY ADJUSTING THE NATURAL AND ARTIFICIAL STIMULI TO THE EXACT TONE OF THE IRRITABLE FIBRE.

If the recovery of the *torpor* is more uniformly certain, it is not only because the torpor is more gradual, but because the degree of heat is regulated by the steady, unerring hand of NATURE; whereas in man, it is governed by the uncertain and often capricious rules of ART.

S E C T. * XI.

THE MANNER IN WHICH INFLAMMATORY FEVERS,
RHEUMATISMS, AND COLDS, ARE PRODUCED.

ON going into a *cold bath*, suppose at 33 degrees of heat on Fahrenheit's scale, the action of the capillary arteries of the skin is *diminished*, or ceases for a time. Hence less or no blood passes these capillaries, and paleness succeeds. But soon after emerging from the bath, a more florid colour, and a greater degree of heat, is generated on the skin than was possessed before immersion; for the capillary arteries, after their quiescent state, occasioned by the want of stimulus, become *more irritable* than usual to their natural stimuli, owing to the *accumulation of irritability*, and hence a greater quantity of blood is transmitted through them, and in consequence a greater degree of heat succeeds. Besides the *quiescence* of the minute vessels of the lungs, there are many other systems of vessels which become torpid from their irritative associations with those of the skin.

From the *quiescence* of such extensive systems of vessels as the capillaries of the skin, and the minute vessels of the lungs, with their various absorbent series, a great *accumulation of irritability* is occasioned; part of which is again expended in the increased exertion of all these vessels, with an
universal

universal glow of heat in consequence of this exertion, and the remainder of it adds vigour to both the vital and voluntary exertions of the whole day.

If the activity of the subcutaneous vessels, and of those with which their actions are associated, was too great before cold immersion, as in the hot days of summer, by which the *irritable principle* was previously *diminished*, we see the cause why the cold bath gives such present strength; namely, by stopping the unnecessary activity of the subcutaneous vessels, and thus preventing the too great *exhaustion* of the *irritable principle*.

In those constitutions where the degree of *irritability*, or of debility, is greater than natural, the coldness and paleness of the skin, with the quick and weak pulse, continue a long time after the patient leaves the bath; and the subsequent heat approaches by unequal flushings, and he feels himself disordered for many hours. Hence the bathing in a cold spring of water, where the heat is but 48 degrees of Fahrenheit's thermometer, much disagrees with those of weak or unirritable habits of body; who possess so little of the *irritable principle*, that they cannot without injury bear to have it diminished even for a short time; but who can nevertheless bear the more temperate coldness of Buxton baths, which is about 80 degrees of heat, and which strengthens them, and makes them by habit less liable to great *quiescence* from small variations

tions of cold, and thence less liable to be disordered by the unavoidable accidents of life. Hence it appears, why people of these inirritable constitutions, which is another expression for a defective irritability, are often much injured by bathing in a cold spring of water; and why they should continue but a very short time in baths which are colder than their bodies; and should gradually increase both the degree of coldness of the water, and time of their continuance in it, if they would obtain salutary effects from cold immersions *.

One Richard Edwards, of Liverpool, a healthy young man, twenty-eight years of age, with black hair and a ruddy complexion, went into some fresh water, which was about the temperature of mild weather, viz. about 40 degrees by the thermometer. He continued in this water 3 minutes, and then went into a warm bath at 90 degrees.

Here for the first moments he felt very warm, but his hands and feet gave him pain, and in two minutes, being still in the warm bath, he was seized with shivering. The water was now increased in heat 6 degrees, but our experimentalist still felt cold; the heat was further increased 10 degrees, and after remaining in the warm bath half an hour, he came out sick and very languid, his pulse was quick and feeble. He passed a very feverish night, and the next day had wandering pains over his

body, with great weakness resembling the *incipient stage* of a fever.

Now it can make little difference whether a person pass from *cold air* or *cold water* into *warm air* or *warm water*; and I have often seen, says Dr. Beckdoes, persons who had long been riding in the cold and wet, experience the *first symptoms* of fever upon coming into a *warm room*, sitting *near the fire*, and *drinking spirits*. After riding in the rain until I have been thoroughly soaked, I have always experienced, says he, a glow, as if my skin had been on fire, merely from putting on dry clothes, and the exertion attending the change of dress. At the same time I have felt within my nostrils the dryness and heat that is perceived at the beginning of a cold, which however I have escaped by keeping cool and for a time. I have known this escape with others; and I have made the observation so often, that I am certain I am right.

A patient lately mentioned to me, says this ingenious physician, among the particulars of her complaint, a circumstance which seems, both on account of its singularity, and the illustration it affords of an *important principle* in animal nature, to be worth recording. Her constitution was one of those, where a small irregularity in diet, exposure to cold, &c. produced pain and disorder in the bowels, sometimes arising to a severe fit of the colic. The patient having one day occasion to walk some hunter, con-

ceived that by removing her hands occasionally out of the *cold spring water* into *warm water*, she should have a better chance of escaping the accustom'd complaint in her bowels. She accordingly heated some water as hot as she could well bear it, and from time to time transferred her arms out of the *cold* into the *hot water*, immersing them pretty deep in the latter. It was on a Saturday in spring: the next morning she was awakened by violent pain under each axilla, and was likewise sensible of a considerable swelling under each axilla. The inflammation continued, and by Tuesday morning the tumors had increased to the size of a twopenny loaf each. They soon afterwards broke, and discharged a large quantity of pus. In about a fortnight both wounds were healed. These circumstances indicate a true *phlegmonic inflammation*, which I suppose may be safely ascribed to the *alternate action of heat and cold*.

Mr. Clarkson, in his Essay on the Impolicy of the African Slave Trade, informs us, that when slaves are brought on board, the seamen, to make room for them, are turned out of their apartments, and sleep for the most part on the decks, from the time of their leaving the coast of *Africa* (where the days are *excessively hot*, and the *nights* *excessively cold and heavy*) to their arrival at the *West-India islands*. From this bad lodging, he proceeds, and this continual exposure to *colds and damps*, and *suddenly* afterwards to a *burning sun*, *FEVERS* originate, which carry

carry many of them off! This fever attacks the whole frame: but the eye commonly feels the inflammation most. The inflammation of the eyes terminates either in dispersion or suppuration: in the first instance the eyes are saved; in the latter they are lost.

The inflammation of the eye is not the only disease produced in Egypt by the succession of *hot days to cool nights*, where it is the custom to sleep during the summer in the open air, any more than on board our slave ships; as the reader will find upon recurring to Alpinus and the later travellers. In both situations causes and effects run parallel. The well known danger of exposure to *dew* in *hot climates*, and indeed in all climates, in certain cases, seem to depend on the same principle. It is also probable that the *heat* of the *preceding day* enables the *jews* of the *night* to prepare the system for the *stimulating effects* of the *heat* of the *preceding day*; so that of two persons who should expose themselves without precaution to the *cold* of the *night* and the *heat* of the *following day*, he who should have been most *exhausted* the day before by the *heat*, would, if other circumstances could be rendered alike equal, be most injured by the next alternation.

Thus when any part of the body has been exposed to *cold*, it is liable to be much more affected by heat and other stimuli than before the exposure. Of this the method of treating *frozen limbs* in cold countries affords a beautiful and decisive proof.

Were a frozen limb to be brought before a fire, or immersed in warm water, a violent inflammation would come on, and speedily terminate in mortification. They therefore take *now* to rub the parts benumbed with cold, and very gradually expose them to a warm temperature. This custom universally obtains in all the northern climates, where the rude inhabitants possess a method of relief that might do credit to the ingenuity of more enlightened nations, and such as is not unworthy of their imitation. The pungent pain felt upon holding an hand much chilled to the fire, is another exemplification of the same principle, which seems, says Dr. Beddoes, to be one of the most general laws of animal nature.

Now after the application of cold, which, according to circumstances, produces a greater or smaller diminution of the actions of the living system, and at length deep itself, there may be an infinite number of gradations between a *fatal inflammation* and a *transitory glow*, and this according as the previous cold and the subsequent heat have varied in intensity;—but whatever be the degree, the effect depends on the same principle.

By respiring a *cold atmosphere* the same thing happens to the nostrils, fauces, lungs, as to the external surface of the body upon going into a *cold bath*; and if we pass suddenly from *such an atmosphere* into a *warm room*, what happens to the skin will in some degree happen to the membrane lining these cavities;

ties; a *glow* or *inflammation* will ensue, according to the difference between the two temperatures and the length of time passed in the cold.

When the application of cold or moisture to a superficial part only is succeeded by an *inflammation* of the respiratory cavities, the consent of the whole system easily explains this remote local affection. The cause of disease pervades at once, and feels as it were, or searches the whole body, but affects only in a degree to draw our notice to the organ which from habit or structure is *most tender*. Suppose a person fainting from the heat of a crowded room, a window is thrown open with the door, and many are exposed to a current of cold air, yet *how various* are the disorders produced! Should any other part, from previous circumstances, have been rendered more sensible to its influence, we shall in consequence have either a sore throat, a diarrhoea, a stiff neck, tooth-ach, or the rheumatism, in place of a catarrh.

Children are so susceptible of *inflammation* that a great part of the mortality among them is, as far as I have observed and can judge, to be ascribed to the ignorance of mothers and nurses of the power which even a moderate change of temperature, if suddenly made, has to affect their tender and irritable frame.

<i>Names of the Parents.</i>	<i>L.</i>	<i>D.</i>	<i>Names of the Parents.</i>	<i>L.</i>	<i>D.</i>
Marg. Jones - - -	6	3	Samuel Holyhead - -	4	8
Mary Holmes - - -	4	0	George Higleyer - -	8	0
Thomas Sanford - -	7	4	Constant Richards - -	3	0
John Smouch - - -	6	6	Mary Waller - - -	3	0
Anne Roberts - - -	3	0	Edward Evans - - -	3	4
E. Felton - - - -	7	6	Anne Hughes - - -	4	2
E. Jinks - - - - -	1	6	Jane Ingram - - - -	3	1
R. Richards - - - -	1	0	John Hammond - - -	4	2
Robert Piggings - -	7	1	Elizabeth Smith - -	3	4
E. Ward - - - - -	3	2	Mary Richards - - -	2	1
Sarah Colley - - -	4	1	Sarah Richards - - -	6	0
Lucy Clark - - - -	3	6	Catherine Harper - -	5	0
Elizabeth Hugenon -	4	4	Anne Hutchinson - -	4	3
Joseph Sonds - - -	3	1	Philip Saunders - -	4	0
John Holyhead - - -	4	3	Elizabeth Heath - -	7	1
Thomas Felton - - -	7	2	Mary Ames - - - -	7	1
Anne Williams - - -	7	1	Mary Bagnold - - -	4	0
John Smith - - - -	5	2	Elizabeth Mansfield -	4	1
Joseph Hutchinson -	4	0	Elizabeth Evans - -	4	0
J. Ellis - - - - -	3	3	Anne Horton - - - -	3	0
Elizabeth Poigner -	3	1	Thomas Ingram - - -	3	0
Anne Wiclinton - -	6	4	Joseph Ingram - - -	3	0
Jane Underwood - -	5	-	Jane Swanwick - - -	5	2
Jane Fields - - - -	3	-	John Befton - - - -	1	1
James Ingram - - -	2	2	John Bodick - - - -	5	0
John Atkey - - - -	5	0	Joseph Means - - -	6	3
John Smith - - - -	2	0			
E. Horton - - - - -	1	0			
E. Hollinhead - - -	5	5			
			55	* Total -	224

* This enquiry was made by Dr. Beddoes, at *Shropshire*, where firing is very plentiful and cheap. It was asked of each grown up person there, how many children he had had, and how many were dead? In the first column you have the name of the family; in the next the number of the children alive; and the third the number of the children dead. Whenever accurate registers of the mortality of the human species, in climates equally warm, shall be kept, I expect that not half so many infants will be found to die as in *Great Britain*.

Now

Now which, think you, is the most likely, that there should be something *wrong* in *our management*? or that *three parts in four* of our fellow creatures should, in one of the most airy towns in *Great Britain*, be doomed unavoidably to perish before they come to their full growth, without answering any other purpose than to give trouble and endure pain? If this last be the case, then of all the things in this wide world, the human frame is the worst contrived and executed. And I leave you to judge whether such a supposition stands to reason. If then *our management* of our children be *wrong* in any material points, a stop may be put to this *excessive mortality*, for we should have only to find out what these points are, and shape our conduct accordingly. One may with the greater propriety embrace an opportunity of disseminating the knowledge, "how COLDS, INFLAMMATORY FEVERS, and RHEUMATISMS, are caught," as their proximate causes, and the manner in which they are to be got rid of, though in my opinion perfectly ascertained, is far from being generally understood even by the members of the medical profession; and if any person, not belonging to that profession, should suspect this to be a wanton paradoxical assertion, he may find in the case of *opium*, and of the cool treatment of *small-pox*, &c. instances equally striking, where one generation of pathologists passed away after another, without being able, in the case of

opium *, to perceive the *plainest appearances*, or, as that of *small-pox*, to draw *the simplest conclusion*. So fervently imitative an animal is man! So loath to employ his own powers of perception and thought!

The sudden, and sometimes severe, change of weather to which this climate is subject, perhaps the most unhappy circumstances attending our situation; and the pernicious effects of them upon the human constitution are so frequently experienced, that diseases of the breast may be truly considered as endemical among the inhabitants of this island. We frequently find a *cold* and *keen* day succeeded by one as *mild* as spring or *warm* as summer; or, what is still worse, the forenoon accompanied with a *sharp, dry, biting north-east* wind, and the latter part of the day uncommonly *warm*. It is impossible but this sudden change from *cold to heat* must, in delicate constitutions especially, be productive of mischief.

When alterations of weather from *cold to heat* succeed gradually, those salutary powers of accommodation with which the animal economy is furnished,

* One cannot compare Haller's clear and satisfactory parallel of *wise* and *opium*, published in 1769 (El. Physiolog. t. V. p. 610—11.) with Cullen's perplexed and hypothetical doctrine of *opium*, and his whole article *sedentia*, published in 1789 (Mat. Medica, t. ii. 217, *et seq.*) without a sense of humiliation! —Dr. BEDDOES.

vised, may prevent any mischief or disorders, though an alteration in the constitution proportioned to that in external nature must necessarily attend those changes; but that which might, without inconvenience to the constitution, be produced gradually, will, if too sudden and abrupt, be felt as a disease; as a man may with ease and safety gradually descend a flight of steps, when a sudden jump from them would endanger his life. Thus we bear without injury the *heat of spring* after the *coldest winter*, though it must be confessed that disorders take on at that season a more inflammatory appearance.

But where the change is more violent than in the transition from one season to another, as when *Europeans* go to the *East or West Indies*, until the constitution becomes accommodated to the climate, the uncommon heat to which such persons are exposed, must have a most powerful effect on their irritable organs. Immediately on the arrival of *northern strangers* within the *tropics*, their circulation becomes quicker, their perspiration freer; a lassitude or debility takes place, from the uncommon expence of the irritable principle consumed by the increased actions of the heart and arteries, and the secretions dependant in a great measure on their movements. In short, the pulse is rendered harder, fuller, and stronger. The skin is redder than usual, but especially that of the face, with other signs of

general plethora *, to which the fluids from increased absorption certainly contribute, though it chiefly arises from the increased force of the vascular system. In short, more or less of *fever* is kept up, which varies in different people, according to circumstances, continues for an indeterminate time, or until the increased force of the heart and arteries, kept up by the *accumulated irritability* of the system, from the previous effect of *cold*, ceases, that is, until the right balance between the irritability of the fibre and the external stimuli be properly adjusted.

But if, on the contrary, we pass from a *warm* to a *cold* climate no such evil effects are observed to take place. *Linnaeus*, in a paper in the *Actuæ Academiæ*, expresses his astonishment at the impunity with which the *beated* Laplander rubs himself with *snow*, or even rolls in the *snow*, and drinks the *cold snow water*. We every day see *horses* in a state of the *most profuse perspiration* freely washed with *cold water*, and always *without injury*. I have, says Dr. Beddoes, within these two years, caused horses, accustomed to be stabled, to be turn-

* HEAT has the property of *expanding* all bodies: thus a circular piece of iron made exactly to pass through a ring, when heated, will be found too large, and thus the rings on the fingers of those who have passed into warmer climates, will be found, from the increased size of that part of the *body*, too tight. In the *cold fit* of an *ague* rings are observed to drop off. But the *PLETHORA* here spoken of arises from the increased action of the *absorbents*, as well as the *vascular system*.

ed out in winter; and no cough, catarrh, or other disorder, has ever been the consequence. It appears therefore to me, adds this ingenious physician, that within certain limits, and those not very narrow, the transition from a *higher* to a *lower temperature* is attended with *no danger* to animals in a state of tolerable health; and a person, I conceive, might *suddenly pass* from an *higher* to a *lower temperature* without inconvenience, even where the difference is so great as to be capable of producing *considerable inflammation*, if the change should be made with equal celerity in a contrary direction.

It has been before observed, that if you keep one of your hands in *cold water* for two minutes; then put *both hands* into *warm water*; and the hand which has been in the *cold water* first will feel much the *warmest* of the two. Or else, handle some *substance* with one hand, while you keep the other in your *bosom*, that it may be no colder than the rest of your body; now bring *both* within an *equal distance* of the *fire*, and you will feel *how much more* THE HEAT affects the *cold* than the *warm hand*. This would be a *dangerous experiment* were the hand kept *too long* in the *snow*; or if the *fire* be *too strong*. For in some countries where the *cold* is much greater than it ever is in England, it is common for people to have their toes and fingers and ears so *frost-bitten* as to lose all their feeling; and should that person warm them at a fire, or put them into *warm water*, a VIOLENT INFLAMMATION is sure to come on, and the part *mortifies*. So they are obliged to set cautiously

tion, about bringing the part back to its natural feeling, and they rub it hard with *snore*, by which means they recover it in the gentlest and most gradual manner.

So when a person is out in very *cold weather*, the air, every time he draws his breath, brushes his *nostrils, wind-pipe, and lungs*; and, just as is the case with the *outward skin*, it makes *these parts more liable to be INFLAMED by HEAT*.

If you attend to what not unfrequently happens in coming out of a *cold moist air* into a *warm room*, you will first perceive a *glow* within your nostrils and breast, as well as all over the surface of your body. Soon afterwards, more especially, if you drink warm or spirituous liquors, a disagreeable dryness, or hoarseness, will be felt in the nostrils and breast; by and by a short tickling cough will come on from an increased secretion of the glands of the nose, fauces, and wind-pipe, which being of a sharp nature stimulates the glands to a further increase of secretion, which often occasions a very large discharge of sharp mucus. You will perhaps at first shiver a little; this will make you draw nearer the fire and drink some more brandy and water: but it will be all to no purpose. The more you try to *heat yourself*, the more chilly and uncomfortable will you become, for you have now *caught cold*, that is, you have brought on AN INFLAMMATION of the *chilled part*, which is the smooth moist membrane which lines the nostrils and goes down the wind-pipe into the lungs.

I have

I have sometimes been able to make other persons, says Dr. Beddoes, attentive to the progress of these phenomena, and nothing has appeared more evident, than that during exposure to *wet* and *cold* no tendency to INFLAMMATION is perceptible, but that *subsequent heat, exercise* in the dry, and *stimulants*, produce the *glow* or INFLAMMATION.

By keeping *quiet* and *cool* for some time after being *wet* in summer, and by avoiding a *sudden transition* into a *warm temperature* in cold weather, and by *temperance* with regard to diet, (rather *abstemiousness*), in both cases, those INFLAMMATORY DISEASES, for which *cold* only *prepares the system*, may be easily avoided; and any person, by acting upon these *principles*, may have at pleasure a *slight* or a *violent catarrh*, or probably *no catarrh at all*.*

The

* This important improvement for the prevention and cure of catarrh is among the early discoveries of Dr. John Brown. He laboured under a most severe cold and hoarseness. Among the symptoms he felt an increased sensibility to cold. He knew not what to think of this fact. In the anxiety he groined his feelings, and in a warm season of the year shut out every avenue that could let in air, and put on an additional garment. He ate full meals of animal food, and took some warm brandy and water after supper in a moderate proportion. He did not debar himself from exercise in the middle of the day, but while under this plan of treatment, he perceived his hoarseness and cold manifestly to increase. He had besides every day to lecture to his class, and now scarcely could be heard, and speaking was a great labour. He began at last to perceive, that stimulants aggravated his disorder, and without hesitation began an opposite course of management. He therefore forsook a warm room, let the air play around

The *popular treatment*, therefore, of *colds* during their early stage is just as prejudicial as the ancient *regimen* during the *SMALL-POX*. White wine whey, buttered ale, increased clothing, getting drunk, &c. *originated* from the supposition, that *colds* proceeded from *obstructed perspiration*, whereas it is found, from the very accurate experiments of *Sanctorius*, and our countryman *Dr. Keil*, that *the perspiration* is at that time *as abundant* as at any other. It has *continued*, because the faculty were, till of late, unapprized of *the nature of colds*, and from partial success in this dangerous practice: as *perspiration*, when produced, carries off *superfluous heat*. For the fluid that escapes from the body, consists chiefly of watery mucus, which mixing with a large portion of sensible heat, is carried off in the form of steam. Hence the more speedy the evaporation, the more *rapid* is the diminution of heat; or, in more familiar terms, the greater is the degree of cold thus generated in the constitution. Hence *the keeping on of warm* in a disease demanding an *opposite treatment*, has *sometimes* done good, but it is to be feared, it has *not unfrequently* done harm; whereas the treatment here laid down is both *safe* and *effectual*.

Among him, continued his diet to vegetable aliment, chiefly water-gruel, obtained from strong drinks, and substituted in their room plenty of barley water. The result was, that a cold that had remained several weeks was cured in a few days. Afterwards, says he, had occasion to try the same management on myself, and others, and always experienced the same effect.

OUR
RELATIONSHIP
TO
HUNGER.

SECT. XII.

OF H U N G E R.

As the narrative of the voyage of Captain Bligh to the South seas, for the purpose of conveying the BREAD-FRUIT to the *West-Indies*, and his *sufferings* and *preservation*, are very interesting, and appertain to the subject of this section, it is presumed, that a detail of them will not be found unacceptable to that class of readers for whom this work is compiled, who wish to find the agreeable blended with the useful. They are therefore recorded at greater length than some other classes of readers will perhaps approve of.

The king having been graciously pleased to comply with a request from the merchants and planters interested in his Majesty's *West India* possessions, that the BREAD-FRUIT TREE * might be introduced

* In the *Society Islands* the BREAD-FRUIT grows on a tree which is the size of a middling oak; its leaves are frequently about a foot and a half long, of an oblong shape, deeply sinuated like those of the fig tree, which they resemble in colour, and in the exuding of a white milky juice upon being broken. *The fruit is about the size and shape of a child's head.* The eatable part lies between the skin and the core; it is as *white as snow*, and somewhat of the consistence of new bread. It serves as the principal food to the inhabitants of these islands,

reduced into those islands, a vessel, proper for the undertaking, was bought, and taken into dock at Deptford, to be provided with the necessary fixtures and preparations for executing the object of the voyage. These were completed according to a plan made by Sir Joseph Banks, which, in the event, proved the most advantageous that could have been adopted for the intended purpose.

The ship was named *Bounty*. Lieutenant William Bligh was appointed to command her. The great cabin was appropriated for the preservation of the plants. It had two large sky-lights; and on each side three skylines for air, and was fitted with a false floor cut full of holes to contain the garden pots, in which the plants were to be brought home. The deck was covered with lead, and at the four most corners of the cabin were fixed pipes to carry off the water that drained from the plants, into tubs placed below to save it for future use.

The ship was stored and victualled for eighteen months. In addition to the customary allowance of

islands, to procure which costs them nothing but the labour of climbing the tree. This tree, however, does not shoot up spontaneously; but if a man plants ten in his life time, which he may do in about an hour, he will as completely fulfil his duty to his own and future generations, as the natives of our less temperate climate can do by ploughing in the cold winter, and reaping in the summer's heat, as often as these seasons return: even if, after he has procured bread for his present household, he should convert a surplus into money, and lay it up for his children. From Captain Cook's *Voyage*.

provisions, it was supplied with four krow, potatoes, soup, essence of malt, and a proportion of barley and wheat. The captain was likewise furnished with a quantity of iron-work and tinkers; to serve in his intercourse with the natives in the *South Seas*.

The *object* of all the former voyages to the *South Seas*, undertaken by the command of his present majesty, has been the advancement of science and the increase of knowledge. This voyage may be reckoned *first*, the intention of which has been to derive *benefit* from those distant discoveries.

After a voyage of ten months the ship *Bounty* arrived safe at *Otaheite*. As they drew nigh, a great number of canoes came off to them. Their first inquiry was, whether they were friends, and whether they came from *Britain*. They were no sooner satisfied in this, than they crowded on board in vast numbers, notwithstanding the endeavours which were made to prevent it, and in less than ten minutes, the deck was so full that the captain could scarce find his own people.

The next morning I went on shore, says Captain Bligh, with the chief Poeno, accompanied by a multitude of the natives. He conducted me to the place where we had fixed our tents in 1777, and desired that I would appropriate the spot to the same use. We then went across the beach, and through a walk delightfully shaded with *bread fruit trees*, to his house. Here we found two women at work staining a piece of cloth red. These were his

wife and her sister. They desired me to sit down on a mat, which was spread for the purpose, and with great kindness offered me refreshments. I received the congratulations of several strangers, who came up to us and behaved with great decorum and attention. The people, however, thronged about the house in such numbers that I was much incommoded by the heat, which being observed, they respectfully drew back. They made many inquiries after Sir Joseph Banks, and many of their former friends. They said a ship had been there, from which they had learnt that Captain Cook was dead, but the circumstances of his death they did not appear to be acquainted with. The captain they called Tonah. I understood likewise from them that Lieutenant Watts was in the ship; who, having been here in the *Resolution* with Captain Cook, was well known to them. In turn I very eagerly enquired after my friend Omai; and it was a sensible mortification and disappointment to me to hear, that not only Omai, but both the New Zealand boys who had been left with him, were dead. Every one agreed in their information that they died a natural death. I next inquired about the cattle that had been left here by Captain Cook, but the accounts I received were very unfavourable, and so various, that for the present I shall forbear speaking of them. I had, however, the satisfaction to find that the island had received some benefit from our former visit. Two *Shaducks* were brought to me,

me, a fruit which they had not till we introduced it. And among other things were *cassipouas*, *pumkins*, and two young goats.

The next morning early, I received a message from Otoo, to inform me of his arrival from the back of the island, and requesting I would send a boat for him, which I immediately did, with an officer to conduct him on board. He came with numerous attendants, and expressed much satisfaction at our meeting. After introducing his wife to me, we *rubbed our noses together*, which is the customary manner of saluting.

In the morning I returned Tinal's visit. I made him understand, that my visit was designed as a particular compliment to him, and gave him a second present, equal to the first, which he received with great pleasure; and to the people of consequence, that were about him, I also presented some article or other. There were a great number of children; and, as I took notice of the little ones that were in arms and gave them beads, both small and great, but with much drollery and good humour, endeavoured to profit by the occasion. Boys, and even grown up persons, were caught up in arms and brought to me, which created much laughter; so that in a short time I got rid of all I had brought on shore.

My next object was to go to *Opur*, to see if Nelson could be able to procure any plants there, but I gave the credit of my visit to young Otoo, the

the eldest son of Tinali, and who had taken his name.

I prepared a magnificent present for this youth, who was represented to me as a person of the highest rank in the island.

Tinali, understanding from my conversation that I intended visiting some of the neighbouring islands, very earnestly requested I would not think of leaving *Matavai*. "Here," said he, "you shall be supplied plentifully with every thing you want. All here are your friends, and friends of King George: if you go to the other islands, you will have every thing stolen from you." I replied, that, on account of their good will, and from a desire to serve him and his country, King George had sent out those valuable presents to him; and will not you, Tinali, send something to King George in return? "Yes," he said, "I will send him any thing I have;" and then began to enumerate the different articles in his power, among which he mentioned the BREAD-FRUIT. This was the exact point to which I wished to bring the conversation; for I had given directions to every one on board not to make known to the islanders the purpose of our coming, lest it might enhance the value of the *bread-fruit* plants, or occasion other difficulties; and, seizing an opportunity which had every appearance of being undesigned and accidental, I told him the *bread-fruit trees* were what I was sure King George would like; upon which he promised

mised me a great many should be put on board, and seemed much delighted to find it so easily in his power to send any thing that would be well received by King George.

The next day I sent Mr. Christian with a party to erect our tent, and soon after followed him myself. With the consent of Tinah, I fixed a boundary, within which the natives were not to enter without leave, and the chiefs cautioned them against it. The principal use of the tents on shore was for a lodgment for the plants; which, instead of appearing to receive as a favour, I brought the chiefs to believe I was doing them a great honour in carrying these plants as a present from them to the *Marce Rabie no Brihannee*.

Monday, January 5, 1789 At the relief of the watch, four o'clock in the morning, the small cutter was missing. I was immediately informed of it, and mustered the ship's company: when it appeared that three men were absent, Charles Churchill, the ship's corporal; and two of the seamen, William Musprat, and John Millward. They had taken with them eight stand of arms and ammunition; but what their plan was, or which way they had gone, no one on board seemed to have the least knowledge. I went on shore to the chiefs, and soon received information that the boat was at *Mutavai*; and that the deserters had departed in a sailing canoe for the island *Telbura*.

On this intelligence I sent the master to *Mutavai*

to search for the small cutter, and one of the chiefs went with him; but before they had got half way, they met the cutter with five of the natives, who were bringing her back to the ship. This service, rendered me by the people of *Matavai*, pleased me much, and I rewarded the men accordingly.

I told Tinah and other chiefs, that I expected they would get the deserters brought back, for that I was determined not to leave *Otabeie* without them. They assured me, that they would do every thing in their power to have them taken; and it was agreed that Orepyah and Moannah should depart the next morning for *Tetburua* to seize them.

Thursday, January 22, 1789. This afternoon I received a message from Teppahoo, to inform me that our deserters had roamed about, but were now at *Yattaba*. I ordered the cutter to be got ready, and a little before sun-set left the ship, taking Adieu with me. When we arrived at Teppahoo's house, we were very kindly received by him and his wife. The deserters, he informed me, were in a house close to us, and I imagined there would not be much difficulty in securing them with the assistance of the natives. They had heard of my arrival; and when I was near the house, they came out, without their arms, and delivered themselves up.

I learnt from the deserters, that at *Tetburua* they had seen Orepyah and Moannah, who had made an attempt to secure them. They said it was their
8 intention

intention to have returned to the ship; and it is probable that they were so much harassed by the natives watching for an opportunity to surprise them, that they might wish to have the merit of returning of their own accord, to avoid the disgrace of being seized and brought back.

Friday, February 6. An occurrence happened to-day that gave me great concern, not only on account of the danger with which the ship had been threatened, but as it tended to diminish the confidence and good understanding which had hitherto been constantly preserved between us and the natives. The wind had blown fresh in the night, and at day light we discovered that the cable, by which the ship rode, had been cut near the water's edge, in such a manner, that only one strand remained whole.

While we were securing the ship, Tinah came on board. I could not but believe he was perfectly innocent of the transaction; nevertheless, I spoke to him in a very peremptory manner, and insisted upon his discovering and bringing to me the offender.

My suspicions fell chiefly, I may say wholly, on the strangers that came to us from other parts of the island; for we had on every occasion received such unreserved and unaffected marks of good will from the people of *Matavai* and *Opar*, that in my own mind I entirely acquitted them.

The anger which I expressed, however, created

to much alarm, that old Otow and his wife (the father and mother of Tinah) immediately quitted *Opar* and retired to the mountains in the midst of heavy rain, as did Teppahoo and his family.

Tinah and Ideah expostulated with me on the unreasonableness of my anger against them. He said, he would exert his utmost endeavours to discover the guilty, that most probably the attempt had been made by people from the other islands out of enmity to the inhabitants of *Mutuai* and *Opar*, every one knowing the partiality I had for them, and that I had declared I would protect them against their enemies.

All this I believed, but I did not think proper to appear perfectly satisfied, lest Tinah, who was naturally very indolent, should not be active in his endeavours to detect the offender.

Saturday passed without my seeing any thing of Tinah the whole day. The next morning, he and Ideah came to me, and assured me they had made the strictest inquiries concerning the injury intended us, but had not been able to discover any circumstance which could lead them to suspect who were concerned in it. This was not at all satisfactory, and I behaved to them with great coolness, at which they were much distressed, and Ideah at length gave vent to her sorrow by tears. I could no longer keep up the appearance of mistrusting them; but I earnestly recommended to them, as they valued the king of England's friendship, that they would exert
3 their

their utmost endeavours to find out the offenders, which they faithfully promised. Our reconciliation accordingly took place, and messengers were sent to Otow and Teppahoo to invite them to return.

It has since occurred to me, that this attempt to cut the ship adrift, was most probably the act of some of our own people; whose purpose of remaining at *Otabetha* might have been effectually answered if the ship had been driven on shore. At the time, I entertained not the least thought of this kind, nor did the possibility of it enter into my ideas, having no suspicion that so general an inclination, or so strong an attachment to these islands, could prevail among my people, as to induce them to abandon every prospect of returning to their native country.

Tuesday, March 31. To-day, all the plants were on board, being 1174 pots, 39 tubs, and 14 boxes. The number of *broad-fruit* plants were 1015, besides which we had collected a number of other plants. The *ore*, which is one of the finest flavoured fruits in the world. The *nyab*, which is a fruit not so rich, but of a fine flavour and very refreshing. The *rattab*, not much unlike a chestnut, which grows on a large tree, in great quantities: they are singly in large pods, from one to two inches broad; and may be eaten raw, or boiled in the same manner as Windsor beans, and so dressed, are equally good. The *orai-ab*, which is a very superior kind of plantain. All these I was particularly

particularly recommended to collect by Sir Joseph Banks. I had also taken on board some plants of the *Moro* and *matia*, with which the natives here make a beautiful red colour; and a root called *peeah*, of which they make an excellent pudding.

Friday, April 3. Tinah and his wife, with his parents, brothers, and sister, dined with me to day, and, as I meant to sail early next morning, they all remained on board for the night. The ship was crowded the whole day with the natives, and we were loaded with cocoa-nuts, plantains, bread-fruit, hogs, and goats. In the evening there was no dancing or mirth on the beach, such as we had been accustomed to, but all was mournful silence. *

Saturday, April 4. At day-light we weighed. At half past six, there being no wind, we weighed, and towed the ship out of harbour. Soon after the sea breeze came, and we stood off towards the sea. At sunset we bid farewell to *Otabeite*, where for twenty-three weeks we had been treated with the utmost affection and regard, and which seemed to increase in proportion to our stay. That we were not insensible to their kindness, the events which followed more than sufficiently proves: for to the friendly and endearing behaviour of these people, may be ascribed the motives for that event which effected the ruin of an expedition that, there was every reason to hope, would have been completed in the most fortunate manner.

We

We stood to the northward all night, with light winds, and on the 27th of April 1789, at noon, were between the islands *Tafua* and *Koroo*.

Thus far the voyage had advanced in a course of uninterrupted prosperity, and had been attended with many circumstances equally pleasing and satisfactory. A very different scene was, however, soon to take place. A conspiracy was formed, which was to render all our past labour productive only of misery and distress. The means was concerted and prepared with so much secrecy and circumspection, that no one circumstance occasioned the smallest suspicion of the impending calamity.

Friday, April 28. Just before sun-rising, while I was yet asleep, Mr. Christian, with the master at arms, gunner's mate, and Thomas Burkitt, seaman, came into my cabin, and seizing me, tied my hands with a cord behind my back, threatening me with instant death if I spoke or made the least noise: I, however, called as loud as I could, in hopes of assistance; but they had already secured the officers who were not of their party, by placing sentinels at their doors. There were three men at my cabin door, besides the four within. Christian had only a cutlass in his hand, the others had muskets and bayonets.

I was hauled out of bed, and forced on deck in my shirt, suffering great pain from the tightness with which they had tied my hands.

I demanded the reason of such violence, but received

ceived no other answer than abuse, for not holding my tongue.

The master, the gunner, the surgeon, Mr. Elphinstone, master's mate, and Nelson, were kept confined below; and the fore hatchway was guarded by centinels.

The boatswain and carpenter, and also the clerk, Mr. Samuel, were allowed to come upon deck, where they saw me standing abaft the mizen-mast, with my hands tied behind my back, under a guard, with Christian at their head.

The boatswain was ordered to *hoist the launch out*, with a threat, if he did not do it instantly, to take care of himself.

When the boat was out, Mr. Hayward and Mr. Haller, two of the midshipmen, and Mr. Samuel, were ordered into it.

I demanded what their intention was in giving this order, and endeavoured to persuade the people near me not to persist in such acts of violence; but it was to no effect: Hold your tongue, sir, or you are dead this instant, was constantly repeated to me.

I continued my endeavours to turn the tide of affairs, when Christian changed the cutlafs which he had in his hand, for a bayonet that was brought to him, and holding me with a strong gripe by the cord that tied my hands, he with many oaths threatened to kill me immediately, if I would not be

be quiet: the villains round me had their pieces cocked and bayonets fixed.

Particular people were called on to go into the boat, and were hurried over the side; whence I concluded that with these people I was to be set adrift: I therefore made another effort to bring about a change, but with no other effect than to be threatened with having my brains blown out.

The boatswain and seamen who were to go in the boat, were allowed to collect twine, canvass, lines, sails, cordage, an eight-and-twenty gallon cask of water, and Mr. Samuel foreseeing what was to happen, got an hundred and fifty pounds of bread, with a small quantity of rum and wine, also a quadrant and compass; but he was forbidden, on pain of death, to touch either map, ephemeris, book of astronomical observations, sextant, time-keeper, or any of my surveys or drawings.

The mutineers having forced those of the seamen, whom they meant to get rid of, into the boat, Christian directed a dram to be served to each of his own crew. I then unhappily saw that nothing could be done to effect the recovery of the ship: there was no one to assist me, and every endeavour on my part was answered with threats of death.

The officers were next called upon deck, and forced over the side into the boat, while I was kept apart from every one, abast the mizen-mast;

Christian,

Christian, armed with a bayonet, holding me by the bandage that secured my hands.

The guard round me had their pieces cocked, but on my daring the wretches to fire, they uncocked them.

Isaac Martin, one of the guard over me, I saw, had an inclination to assist me, and as he fed me with shaddock (my lips being quite parched), we explained our wishes to each other by our looks; but this being observed, Martin was removed from me.

He then attempted to leave the ship, for which purpose he got into the boat; but with many threats they obliged him to return.

The armourer, Joseph Coleman, and two carpenters, Macintosh and Norman, were also kept contrary to their inclinations; and they begged of me, after I was ashore in the boat, to remember that they declared they had no hand in the transaction. Michael Byrne likewise wanted to leave the ship.

It is of no moment for me to recount my endeavours to bring back the offenders to a sense of their duty: all I could do was by speaking to them; but it was to no purpose, for I was kept securely bound, and no one, except the guard, suffered to come near me.

To Mr. Samuel I am indebted for securing my journals and commission, with some material ship papers.

Without these I had nothing to certify what I had

had done, and my honour and character might have been suspected, without my possessing a proper document to have defended them. All this he did with great resolution, though strictly guarded. He attempted to save the time-keeper, and a box with my surveys, drawings, and remarks for fifteen years past, which were numerous; when he was hurried away, with, "Damn your eyes, you are well off to get what you have."

It appeared to me, that Christian was some time in doubt whether he should keep the carpenter or his mates; at length he determined on the latter, and the carpenter was ordered into the boat. He was permitted, but not without great opposition, to take his tool chest.

Much altercation took place among the mutinous crew during the whole business: some swore, "I'll be damned if he does not find his way home, if he gets any thing with him," meaning me; and, when the carpenter's chest was carrying away, "Damn my eyes, he will have a vessel now." While others laughed at the *helpless situation* of the boat, being very deep, and so little room for those who were in her. As for Christian, he appeared like a madman.

The officers and men being in the boat, they only waited for me, of which the master at arms informed Christian; who then said, "Come, Captain Bligh, your officers and men are now in the boat, and you must go with them; if you at-
tempt

"temper to make the least resistance you shall instantly be put to death;" and without further ceremony, with a tribe of armed ruffians about me, I was forced over the side, where they untied my hands.

Being in the boat, we were veered astern by a rope. A few pieces of pork were thrown to us, and some clothes, also four cutlasses; and it was then that the armourer and carpenters called out to me to remember that they had no hand in the transaction.

After having undergone a great deal of ridicule, and been kept some time to make sport for these unfeeling wretches, we were at length cast adrift upon the wide ocean.

I had with me in the boat the following persons :

Names.	Stations.
John Fryer, - - - -	<i>Master.</i>
Thomas Ledward, - - -	<i>Acting Surgeon.</i>
David Nelson, - - - -	<i>Botanist.</i>
William Peckover, - - -	<i>Gunner.</i>
William Cole, - - - -	<i>Boatman.</i>
William Purcell, - - -	<i>Carpenter.</i>
William Elphinstone, - -	<i>Master's Mate.</i>
Thomas Hayward, - - -	<i>Midshipman.</i>
John Haller, - - - -	<i>Ditto.</i>
John Norton, - - - -	<i>Quarter-master.</i>
Peter Linklater, - - - -	<i>Ditto.</i>
Lawrence Lechogue, - - -	<i>Sail-maker.</i>
John Smith, - - - -	<i>Cook.</i>

Thomas

Names.	Stations.
Thomas Hall, - - -	<i>Ditto.</i>
George Simpson, - - -	<i>Quarter-master's Mate.</i>
Robert Tinkler, - - -	<i>A Boy.</i>
Robert Lamb, - - -	<i>Butcher.</i>
Mr. Samuel, - - -	<i>Clerk.</i>

There remained on board the *Bounty*,
 Fletcher Christian, - - - *Master's Mate.*

Christian, the head of the mutineers, is of a respectable family in the north of England. This was the third voyage he had made with me; and, as I found it necessary to keep my ship's company at three watches, I had given him an order, the night previous to the mutiny, to take charge of the third, his abilities being thoroughly equal to the task.

Peter Haywood, - - - *Midshipman.*

Haywood is also of a respectable family in the north of England, and a young man of abilities, as well as Christian. These two had been objects of my particular regard and attention, and I had taken great pains to instruct them, having entertained hopes that, as professional men, they would have become a credit to themselves and their country.

Edward Young, - - - *Midshipman.*

Young was well recommended, and had the look of an able stout seaman: he, however, fell short of what his appearance promised.

Edward Stewart, - - - *Midshipman.*

Stewart was a young man of creditable parents in the *Orkneys*; at which place, on the return of the *Resolution* from the *South Seas* in 1780, we received so many civilities, that, on that account only, I should gladly have taken him with me: but, independent of this recommendation, he was a seaman, and had always borne a good character.

Names.	Stations.
Charles Churchill,	<i>Master at Arms.</i>
John Mills,	<i>Gunner's Mate.</i>
James Morrison,	<i>Ditto.</i>
Thomas Burkitt,	<i>Boatwain's Mate</i>
Mathew Quintal,	<i>Abse Seaman.</i>
John Sumner,	<i>Ditto.</i>
John Millward,	<i>Ditto.</i>
William Mackoy,	<i>Ditto.</i>
Henry Hillbrandt,	<i>Ditto.</i>
Michael Byrne,	<i>Ditto.</i>
William Musprat,	<i>Ditto.</i>
Alexander Smith,	<i>Ditto.</i>
John Williams,	<i>Ditto.</i>
Thomas Ellison,	<i>Ditto.</i>
Isaac Martin,	<i>Ditto.</i>
Richard Skinner,	<i>Ditto.</i>
Matthew Thompson,	<i>Ditto.</i>
William Brown,	<i>Gardener.</i>
Joseph Coleman,	<i>Emmourer.</i>
Charles Norman,	<i>Carpenter's Mate.</i>
Thomas Macintosh,	<i>Carpenter's Crew.</i>

In all 26 hands, and the most able men of the ship's company.

Notwithstanding the roughness with which I was treated, the remembrance of past kindnesses produced some signs of remorse in Christian. When they were forcing me out of the ship, I asked him, "If this treatment was a proper return for the many instances he had received of my friendship?" He appeared disturbed at my question, and

and said, with much emotion, "It is that, Captain Bligh, which afflicts me, and makes me in hell."

Having little or no wind, we rowed pretty fast toward *Tofea*, which bore N. E. about 10 leagues from us.

While the ship was in sight she steered N. N. W. but I considered this only as a feint; for when we were at a distance, "*Huzza for Otahite*," was frequently heard among the mutineers.

As soon as I had time to reflect, I felt an inward satisfaction, which prevented any very great depression of spirits: conscious of my integrity, an anxious solicitude for the good of the service, in which I had been engaged, I found my mind very much supported, and began to conceive hopes notwithstanding so heavy a calamity, that I should one day be able to account to my king and country for the misfortune.

A few hours before, my situation had been peculiarly flattering. I had a ship in the most perfect order, and well stored with every necessary both for service and health: by early attention to those particulars, I had, as much as lay in my power, provided against any accident, in case I could not get through *Endeavour Straits*, as well as against what might befall me in them; added to this, the plants had been successfully preserved in the most flourishing state: so that, upon the whole, the voyage was two thirds completed, and the remaining part, to all appearance, in a very

promising way : every person on board being in perfect health, to establish which was ever amongst the principal objects of my attention.

It may be very naturally asked, what could be the reason for such a revolt? In answer to which I can only conjecture, that the mutineers had flattered themselves with the hopes of a more happy life among the *Otabeiteans*, than they could possibly enjoy in England; and this, joined to some female connexions, most probably occasioned the whole transaction.

The women of *Otabeite* are handsome, mild, and cheerful in their manners and conversation, possessed of great *sensibility*, and have sufficient *delicacy** to make them admired and beloved. The
 chiefs

* *Modesty* is one of the most distinguishing and attractive characteristics of the female sex. *Modesty* has a double effect: it heightens the desire of the male, and deters him from rudeness, or improper behaviour. It both *attracts* and *repels*. There is no part of the female character which men revere so much as *modesty*. It is the brightest and most valuable jewel with which a woman can be adorned. A fine woman without *modesty*, instead of gaining the affections of men, becomes an object of contempt. It is, therefore, not only the interest of females to cultivate *modesty*, but to guard, with the most anxious attention, against the smallest encroachments. Every attack, however apparently insignificant, should be repelled with firm and intrepidity. To men of sensibility, a single glance of the eye will tell them that their conduct is improper, and make them not only instantly desist, but prevent any future attempts. It is really the
 interest

chiefs were so much attached to our people, that they rather encouraged their stay among them than otherwise.

Under these, and many other attendant circumstances equally desirable, it is now perhaps not so much to be wondered at, though scarcely possible to have been foreseen, that a set of sailors, most of them void of connexion, should be led away; especially when, in addition to such powerful inducements, they imagined it in their power to fix themselves in the midst of plenty, on one of the finest islands in the world, where they need not labour, and where the allurements of dissipation are beyond any thing that can be conceived.

The utmost, however, that any commander could have supposed to have happened is, that some of the people would have been tempted to desert. But if it should be asserted, that a com-

interest of men to cherish, and not to injure by indelicacy, a quality from which they derive so much pleasure and advantage.

Hail, MODESTY ! fair female honour, hail !

Beauty's chief ornament, without whose charms

Beauty disgusts : or gives but vulgar joys.

CHEAPNESS offends ; hence on the harbor's lip

No rapture hangs, however fair the scene.

However form'd for love and amorous play,

Thou giv'st the squire his grace, the knight a lay.

Its balmy essence scents the air.

ARMSTRONG.

It is curious to observe the power of this quality in the present instance even over rude minds.

mander is to guard against an act of mutiny and piracy in his own ship, more than by the common rules of service; it is as much as to say, that he must sleep locked up, and when awake be girded with pistols, and walk among his men as amidst a gang of robbers.

Defections have happened, more or less, from most of the ships, that have been at the *Society Islands*; but it has always been in the commander's power to make the chiefs return their people. The knowledge, therefore, that it was *unsafe* to desert, perhaps, first led mine to consider with what ease so small a ship might be surprised, and that so favourable an opportunity would never offer to them again.

The *secrecy* of this mutiny is beyond all conception. Thirteen of the party, who were with me, had always lived forward among the seamen; yet neither they nor the messmates of Christian, Stewart, Haywood, and Young, had ever observed any circumstance that made them in the least *suspect* what was going on.

To such a close planned act of villainy, my mind being entirely free from any suspicion, it is not wonderful that I fell a sacrifice. Had their mutiny been occasioned by any grievances, either real or imaginary, I must have discovered symptoms of their discontent, which would have put me on my guard; but the case was far otherwise. I slept with the door of my cabin always open, that the

officer

officer of the watch might have access to me on all occasions, the possibility of such a conspiracy being ever the farthest from my thoughts. Christian, in particular, I was on the most friendly terms with: that very day he was to have dined with me; and the preceding night he excused himself from supping with me on pretence of being unwell, for which I felt concerned, having no suspicion of his integrity and honour.

Fortunately it was calm all the afternoon, till about four o'clock, when we were so far to windward, that, with a moderate easterly breeze which sprung up, we were able to sail. It was nevertheless dark when we got to *Tofa*, where I expected to land to seek a supply of bread-fruit and water. But the shore proved to be so steep and rocky, that we were obliged to give up all thoughts of it, and keep the boat under the lee of the island with two oars; for there was no anchorage. Having fixed on this mode of proceeding for the night, I served to every person half a pint of grog, and each took to his rest as well as our unhappy situation would allow.

Wednesday, April 29. In the morning, at dawn of day, we rowed along shore in search of a landing place, and about ten o'clock we discovered a cove with a stony beach, at the N. W. part of the island, where I dropped the grapnel within 20 yards of the rocks. A great surf ran on the shore; but, as I was unwilling to diminish our stock of provisions, I

landed Mr. Samuel, who climbed the cliffs, and got into the country in search of supplies. It was great consolation to me to find, that the spirits of my people did not sink, notwithstanding our miserable and almost hopeless situation. Towards noon Mr. Samuel returned, with a few quarts of water which he had found in holes; but he had met with no spring, or any prospect of a sufficient supply in that particular, and had seen only the signs of inhabitants. As it was uncertain what might be our future necessities, I only issued a morsel of bread, and a glass of wine, to each person for dinner.

At day-light we attempted to put to sea; but the wind and weather proved so bad, that I was glad to return to our former station near the cove; where, after issuing a morsel of bread and a spoonful of rum to each person, we landed, and I went off with Mr. Nelson, Mr. Samuel, and some others, into the country in search of provisions.

We found a few deserted huts, and a small plantain-walk, from which we collected three small branches of plantains. After passing this place, we came to a deep gully that led towards a mountain, near a *volcano*; and, as I conceived that in the rainy season very great torrents of water must pass through it, we hoped to find sufficient for our use remaining in some holes of the rocks; but, after all our search, the whole that we collected was only nine gallons. We advanced within two miles of the foot of the highest mountain in the island, on which is the volcano,

volcano, which is almost constantly burning. The country near it is covered with *lava*, and has a most dreary appearance. As we had not been fortunate in our discoveries, and saw nothing to alleviate our distress, except the plantains and water above mentioned, we returned to the boat exceedingly fatigued and faint. Every person being returned by noon, I gave about an ounce of pork and two plantains to each, with half a glass of wine. The people who remained with the boat I had directed to look for fish, or what they could pick up about the rocks; but nothing eatable could be found: so that, upon the whole, we considered ourselves on as miserable a spot of land as could well be imagined.

About two o'clock in the afternoon another party set out; but, after suffering much fatigue, they returned in the evening without any kind of success.

At the head of the cove, about 150 yards from the water side, there was a *cave*. This situation secured us from the danger of being surprised, and I determined to remain on shore for the night, with a part of my people, that the others might have more room to rest in the boat with the master; whom I directed to be watchful, in case we should be attacked. I ordered one plantain for each person to be boiled; and having supped on this scanty allowance, with a quarter of a pint of grog, and fixed the watches for the night, those whose turn it was laid down to sleep in the cave, before which we kept

up

up a good fire, notwithstanding which we were much troubled with flies and mosquitoes.

Friday, May 1. At dawn of day, a party was sent out by a different route, to see what they could procure. They however only met with two men, a woman, and a child, who accompanied them to the cove with two cocoa-nut shells of water. I endeavoured to make friends of these people, and sent them away for bread-fruit, plantains, and water. Soon after other natives came to us; and by noon there were thirty about us, from whom we obtained a small supply; but I could only afford one ounce of pork, and a quarter of a bread-fruit, to each man for dinner, with half a pint of water; for I was fixed in my resolution not to use, as yet, any of the bread or water in the boat.

Some of the natives were coming and going the whole afternoon, and we got enough of bread-fruit, plantains, and cocoa-nuts, for another day; but of water they only brought us about five pints. A canoe also came to us with four men, and brought a few cocoa-nuts and bread-fruit, which I bought with buttons and a few beads as I had done the rest.

Towards evening, I had the satisfaction to find our stock of provisions somewhat increased. At sun-set all the natives left us in quiet possession of the cave. I thought this a good sign, and made no doubt that they would come again next day with a better supply of food and water, and we should

could obtain sufficient to stock us for our intended voyage.

At night, I served a quarter of a bread-fruit and a cocoa nut to each person for supper; and, a good fire being made, all but the watch went to sleep.

At day-break, next morning, I was pleased to find every one's spirits a little revived, and that they no longer regarded me with those anxious looks, which had constantly been directed towards me since we lost sight of the ship; every countenance appeared to have a degree of cheerfulness, and they all seemed determined to do their utmost.

As there was no direct certainty of our being supplied with water by the natives, I sent a party among the gullies in the mountain, with empty shells, to see what could be found. In their absence the natives came about us, as I expected, and in greater numbers; two canoes also came in from round the north side of the land. In one of them was an elderly chief. Soon after, some of our foraging party returned, and with them came Elow, a chief. To each of these men I made a present of an old shirt and a knife. They were very inquisitive to know in what manner I had lost my ship. During this conversation, a young man, named Nagere, appeared, whom I remembered to have seen in 1777: he expressed much pleasure at our meeting. The good-will and affability of this man gave me much satisfaction.

This, however, was but of short duration, for the natives began to increase in number, and I observed some symptoms of a design against us. Soon after they attempted to haul the boat on shore, on which I brandished my cutlasses in a threatening manner, and spoke to Esow to order them to desist; which they did, and every thing became quiet again. As we had no means of improving our situation, I told our people I would wait till sun-set, by which time, perhaps, something might happen in our favour: for if we attempted to go at present, we must fight our way through, which we could do more advantageously at night; and that in the mean time we should endeavour to get off to the boat what we had bought.

The beach was lined with the natives, and we heard nothing but the knocking of stones together, which they had in each hand. I knew very well this was the sign of an attack. They frequently importuned me to sit down, but I as constantly refused: for it occurred both to Nelson and myself, that they intended to seize hold of me, if I gave them such an opportunity. At noon I served a cocoa-nut and a bread-fruit to each person for dinner, and gave some to the chiefs, with whom I continued to appear intimate and friendly. Keeping, therefore, constantly on our guard, we were suffered to eat our uncomfortable meal in some quietness.

After dinner we began by little and little to get our things into the boat, which was a troublesome business,

business, on account of the surf. I carefully watched the motions of the natives, who continued to increase in number; and found that, instead of their intention being to leave us, fires were made, and places fixed on for their stay during the night. Consultations were also held among them, and every thing assured me we should be attacked. I sent orders to the master, that when he saw us coming down, he should keep the boat close to the shore, that we might the more readily embark, and in sending this paper down to the boat, it was nearly *snatched away*, but for the timely assistance of the gunner.

When the sun began to set, I gave the word, on which every person who was on shore with me boldly took up his proportion of things, and carried them to the boat.

The chiefs eagerly asked of me, if I did not intend sleeping in the cave as on the preceding night. I said, "No; but in the morning we will again trade with you, and I shall remain till the weather is moderate, when we go, as we have agreed, to *Tongatabu*."

The elder chief then started up, and said, "You will not sleep on shore, then *matie*," which means, we will kill you instantly, and he left us.

The onset was now prepared. Every one made a noise with the stones he held in his hand, and Esow ran from us.

All but two or three things were in the boat, when

when I took Nagete by the hand, and our people walked down the beach, every one in a silent kind of horror.

While I was seeing them embark, Nagete requested me to have a conference with Efew; but I found Efew was encouraging them to make the instant attack, and it was my determination, if they had *then* began, to have killed Nagete, for his treacherous behaviour. I ordered the carpenter not to quit me till the other people were in the boat. Nagete, finding I would not stay, violently loosed himself from my hold, and ran off, and we all got into the boat except one man, who, while I was getting on board, quitted it, and with undaunted bravery ran up the beach to cast the stern fast off, notwithstanding the master and others called on him to return, while they were hauling me out of the water.

I was no sooner in the boat than the attack was begun by about *two hundred men*; the unfortunate sailor who had run up the beach was knocked down, and the stones flew like a shower of shot. Many Indians got hold of the stern-rope, and were near hauling the boat on shore; which they would certainly have effected, if I had not had a knife in my pocket, with which I cut the rope. At this time I saw five of the natives about the poor man they had killed, and two of them were beating him about the head with stones in their hands.

We had no time to reflect, for, to my surprise, they

they filled their canoes with stones, and twelve men came off after us to renew the attack, which they did so effectually as nearly to disable us all. Our grapnel was foul, but fortunately the hook broke, and we got to our oars, and pulled to sea. They, however, could paddle round us, so that we were obliged to sustain the attack without being able to return it, except with such stones as lodged in the boat, and in this I found we were very inferior to them. We could not close, because our boat was lumbered and heavy, of which they well knew how to take advantage: I therefore adopted the expedient of throwing overboard some clothes, which, as I expected, they stopped to pick up; and, as it was by this time almost dark, they gave over the attack, and returned towards the shore, leaving us to meditate on our unhappy situation.

The poor man killed by the natives was John Norron: this was his second voyage with me as quarter-master, and his worthy character made me lament his loss very much. He has left an aged parent, I am told, whom he supported.

Taking this as a sample of the disposition of the natives, there was but little reason to expect much benefit by persevering in the intention of visiting *Tongataboo*; for I could not red their good behaviour formerly to have proceeded, like that of these people, from a dread of our fire arms, and which, therefore, was likely to cease as soon as they knew we were destitute of them: and, even supposing they

they would not destroy us, the boat, and every thing we had which they considered of value, would most probably be taken from us, and thereby all hopes precluded of ever being able to revisit our native country.

We therefore set our sails, and steered along shore by the west side of the island *Tosoa*; the wind blowing fresh from the eastward.

My mind was now busily employed in considering what was best to be done, when I was solicited by all hands to take them towards home:—and when I told them that no hopes of relief remained for us (except what might be found at *New Holland*) till I came to *Timor*, a distance of full 1200 leagues, where there was a Dutch settlement, but in what part of the island I knew not,—to effect which, they all agreed to live on *one ounce of bread and a quarter of a pint of water per day*. Therefore, after examining our stock of provisions, and recommending to them, in the most solemn manner, not to depart from their promise, we bore away across a sea, where the navigation is but little known, in a small boat, twenty-three feet long from stem to stern, deep-laden with *eighteen men*. I was happy, however, to see that every one seemed better satisfied with our situation than myself.

Our stock of provisions consisted of about one hundred and fifty pounds of bread, twenty-eight gallons of water, twenty pounds of pork, three bottles of wine, and five quarts of rum. A few cocoa-

nuts were in the boat, and some bread-fruit, but the latter was trampled to pieces.

It was about eight o'clock at night when we bore away under a reefed lug fore-sail; and, having divided the people into watches, and got the boat in a little order, we returned God thanks for our miraculous preservation, and, fully confident of his gracious support, I found my mind more at ease than it had been for some time past.

At day break the gale increased; the sun rose very fiery and red, a sure indication of a severe gale of wind. At eight it blew a violent storm, and the sea ran very high, so that between the seas the sail was becalmed, and when on the top of the sea it was too much to have set; but we could not venture to take in the sail, for we were in very imminent danger and distress; the sea curled over the stern of the boat, which obliged us to bale with all our might. A situation more distressing has, perhaps, seldom been experienced.

Our bread was in bags, and likely to be spoiled by the wet: to be starved to death was inevitable, if this could not be prevented. Fortunately for us we had on board the carpenter's chest, the tools of which we stowed at the bottom of the boat, and it became a fit place to secure this article.

I next began to examine what clothes there were in the boat, and what other things could be spared; and, having determined the quantity to be kept, the rest was thrown overboard, with some rope and

spare sails, which lightened the boat considerably, and we had more room to bale the water out.

I served a tea spoonful of rum to each person (for we were very wet and cold), with a quarter of a bread fruit, which was scarce eatable, for dinner:—our engagement was now strictly to be carried into execution, and I was fully determined to make our provisions last eight weeks, let the daily proportion be ever so small.

The weather continued very severe. The sea ran higher than in the forenoon, and the fatigue of baling, to keep the boat from filling, was exceedingly great. But among the hardships we were to undergo, that of being constantly wet was not the least: the night was very cold, and at day-light our limbs were so benumbed, that we could scarce find the use of them. At this time I served a *tea spoonful of rum* to each person, FROM WHICH WE ALL FOUND GREAT BENEFIT!

Monday, May 4. I divided five small coconuts for our dinner, and every one seemed satisfied. Served for supper a few broken pieces of bread-fruit, and performed prayers.

The night turned out fair, and, having had tolerable rest, every one seemed considerably better in the morning, and contentedly breakfasted on a few pieces of yams that were found in the boat. After breakfast we examined our bread, a great deal of which was damaged and rotten; this, nevertheless, we were glad to keep for use.

For

For dinner, I served some of the damaged bread, and a quarter of a pint of water.

Wednesday, May 6. We discovered several small islands. Those we were near appeared fruitful and hilly, some very mountainous, and all of a great height. I durst not, however, venture to land, as we had no arms, and were less capable of defending ourselves than we were at *Tofoa*.

Our allowance for the day was a quarter of a pint of cocoa-nut milk, and the meat, which did not exceed two ounces to each person: it was received very contentedly, but we suffered great drought.

To our great joy we hooked a fish, but we were miserably disappointed by its being lost in trying to get it into the boat.

I directed the course W. by N. for the night, and served to each person an ounce of the damaged bread, and a quarter of a pint of water, for supper.

As our lodgings were very miserable, and cramped for want of room, I endeavoured to remedy the latter defect, by putting ourselves to watch and watch; so that one half always sat up while the other lay down on the boat's bottom, or upon a chest exposed to the open air.

Our limbs were dreadfully cramped, for we could not stretch them out; and the nights were so cold, and we so constantly wet, that, after a few hours sleep, we could scarce move.

Thursday, May 7. At dawn of day we discovered land. The country appeared to be agreeably

interspersed with high and low land, and in some places covered with wood.

Being very wet and cold, I served a spoonful of rum and a morsel of bread for breakfast. At this time we observed two large sailing canoes coming swiftly after us along shore, and, being apprehensive of their intentions, we rowed with some anxiety, fully sensible of our weak and defenceless state. Only one of them gained upon us, which, however, by three o'clock in the afternoon gave over chase. If I may judge from the sail of these vessels, they are of a similar construction with those at the *Frisland*, which, with their situation, gives reason to believe they are the same kind of people. Whether these canoes had any hostile intention against us must remain a doubt: perhaps we might have benefited by an intercourse with them; but our defenceless situation, to have made the experiment would have been risking too much.

At four o'clock there was much thunder and lightning, and heavy rain, when every person did his utmost to catch some water, and we increased our stock to 34 gallons, besides quenching our thirst for the first time since we had been at sea; but we passed the night very miserably, for being extremely wet, and having no dry things to shift & cover us, we experienced cold and shiverings scarce to be conceived.

Friday, May 8. The allowance I issued to-day, was an ounce and a half of pork, a *tea-spoonful* of rum,

rum, half a pint of cocoa-nut milk, and an ounce of bread. *The rum, though so small in quantity, was of the greatest service!* For supper I served a quarter of a pint of water, and half an ounce of bread. I endeavoured to amuse my people by describing the situation of *New Guinea* and *New Holland*, and gave them every information in my power, that in case any accident happened to me, those who survived might have some idea of what they were about, and be able to find their way to *Timor*, which at present they knew nothing of but the name.

Saturday, May 9. In the morning, a quarter of a pint of cocoa-nut milk, and some of the decayed bread, was served for breakfast; and for dinner I divided the meat of four cocoa-nuts, with the remainder of rotten bread, which was only eatable by such distressed people. The wind had been moderate all day, in the S. E. quarter, with fine weather; but, about nine o'clock in the evening, the clouds began to gather, and we had a prodigious fall of rain, with severe thunder and lightning. Being miserably wet and cold, I served to the people a *tea-spoonful* of rum each, to enable them to bear their distressed situation. The weather continued extremely bad, and the wind increased; we spent a very miserable night, without sleep, except such as could be got in the midst of rain.

Sunday, May 10. The day brought no relief but its light. The sea broke over us so much, that

two men were constantly baling; and we had no choice how to steer, being obliged to keep before the waves for fear of the boat filling.

The *allowance* now regularly served to each person, was *one 25th of a pound of bread, and a quarter of a pint of water, at eight in the morning, at noon, and at sun-set.*

To-day I gave about half an ounce of pork for dinner, which, though any one would have considered only as a mouthful, was divided into several pieces, and was eat with great slowness.

A fishing line was generally towing from the stern of the boat, but though we saw great numbers of fish, we could never catch one.

The rain abated towards noon, but the wind continued very strong, with very squally weather, and a high breaking sea, so that we were miserably wet, and suffered great cold in the night.

Monday, May 11. In the morning at day-break, I served to every person a *tea-spoonful of rum*, our limbs being so cramped that we could scarce move them. Our situation was now extremely dangerous, the sea frequently running over our stern, which kept us baling with all our strength. In the evening it rained hard, and we again experienced a dreadful night.

Tuesday, May 12. At length the day came, and shewed to me a miserable set of beings, full of wants, without any thing to relieve them.

Some complained of great pain in the bowels, and

and every one of having almost lost the entire use of his limbs.

The little sleep we got was no ways refreshing, as we were covered with sea and rain.

I served a *spoonful* of *rum* at day-dawn, and measured out the 25th of a pound of bread, and a quarter of a pint of water, as yesterday.

The wet weather continued, and in the afternoon the wind came from the southward, blowing fresh in squalls. As there was no prospect of getting our clothes dried, I recommended to every one to strip, and wring them through the salt water, by which means they received a warmth which, when wet with rain, they had not.

Wednesday, May 13. I thought it prudent to keep back the allowance of *rum* at day-break. All day, we were constantly slipping water, and baling, and suffered much cold and shiverings in the night.

Thursday, May 14. Fresh gales at S. E. and gloomy weather, with rain, and a high sea. At six in the morning we saw land, which soon appeared to be four islands, one of them larger than the others, and all of them high and remarkable in appearance *.

Friday, May 15. At one in the morning another island was discovered. A number of grunnets, boobies, and men of war birds were seen. These islands lie between the latitude 13° 16' and

* These were new discoveries.

14° 10' S.; their longitude, according to my reckoning, 15° 51' to 16° 6' W. from the island *Tofoa*; that is 167° 17' E. to 168° 34' E. from *Greenwich*. The largest island I judged to be about twenty leagues in circuit, the others five or six. The easternmost is the smallest island, and most remarkable, having a high sugar-loaf hill. They are fertile, and inhabited, as I saw smoke in several places.

The sight of these islands served only to increase the misery of our situation. We were very little better than starving, with plenty in view; yet to attempt procuring any relief was attended with so much danger, that prolonging of life, even in the midst of misery, was thought preferable, while there remained hopes of being able to surmount our hardships.

The wind was at S. E. with rainy weather all day. The night was very dark, not a star could be seen to steer by, and the sea broke continually over us.

Saturday, May 16. In addition to our miserable allowance of one 25th of a pound of bread, and a quarter of a pint of water, I issued for dinner about an ounce of salt pork to each person. I was often solicited for this pork, but I considered it more proper to issue it in small quantities, than to suffer it to be all used at once or twice, which would have been done if I had allowed it.

The sun breaking through the clouds, gave us hopes of drying our wet clothes; but the sunshine was

was of short duration. We had strong breezes at S. E. by S. and dark gloomy weather, with storms of thunder, lightning, and rain. The night was truly horrible, and not a star to be seen; so that our steerage was uncertain.

Sunday, May 17. At dawn of day, I found every person complaining, and some of them solicited *extra allowance*; which I positively refused. The night was dark and dismal; the sea constantly breaking over us, and nothing but the wind and waves to direct our steerage. *The little rum we had was of great service*: for when our nights were particularly distressing, I generally served a *tea-spoonful or two* to each person: and it was always *joyful tidings* when they heard of my intentions.

Monday, May 18. In the morning the rain abated. The customary allowance of one eighth of a pound of bread, and a quarter of a pint of water, was served at breakfast, dinner, and supper. In the night, we had very severe lightning, with heavy rains; and were obliged to keep baling without intermission.

Tuesday, May 19. Very bad weather and constant rain. With the allowance of bread and water, served half an ounce of pork to each person for dinner.

Wednesday, May 20. Fresh breezes with constant rain: at times a deluge. Always baling. At dawn of day, some of my people seemed half dead: our appearances were horrible; and I could look

no way, but I caught the eye of some one in distress. *Extreme hunger* was now too evident, but no one suffered from thirst. The little sleep we got was in the midst of water, and we constantly awoke with severe cramps and pain in our bones. This morning I served about *two tea-spoonfuls* of rum to each person, and the allowance of bread and water, as usual. All the afternoon we were so covered with rain and salt water, that we could scarcely see. We suffered extreme cold, and every one dreaded the approach of night. Sleep, though we longed for it, *afforded no relief*: for my own part, I *almost lived without it*. About two o'clock in the morning we were overwhelmed with a deluge of rain. It fell so heavy that we were afraid it would fill the boat, and were obliged to bale ~~with~~ all our might.

Thursday, May 21. At ~~the~~ of day I served a larger allowance of rum. ~~The~~ *the* rain abated and the sun shone; but we ~~were~~ *were* miserably cold and wet, the sea breaking constantly over us; so that, notwithstanding the heavy rain, we had not been able to add to our stock of fresh water.

Friday, May 22. Our situation this day was extremely calamitous. We were obliged to take the course of the sea, running right before it, and watching with the utmost care, as the least error in the helm would in a moment have been our destruction. At noon it blew very hard, and the foam of the sea kept running over our stern and quarters. The misery we suffered this night exceeded the preceding.

ing. The sea flew over us with great force, and kept us baling with horror and anxiety.

Saturday, May 23. At dawn of day I found every one in a most distressed condition, and I began to fear that another such night would put an end to the lives of several, who seemed no longer able to support their sufferings.

I served an allowance of *two tea-spoonfuls of rum*; after drinking which, having wrung our clothes, and taken our breakfast of bread and water, we became a little refreshed.

Sunday, May 24. With the usual allowance of bread and water for dinner, I served an ounce of pork to each person. This afternoon we had many birds about us, which are never seen far from land, such as *boobies* and *no-lies*. As the sun for the first time for fifteen days shone bright, and the sea was calmed, so that we shipped but little water, I took the opportunity to examine into the state of our bread, and found that, according to the present mode of issuing, there was a sufficient quantity remaining for 29 days allowance; by which time I hoped we should be able to reach Timor. But as this was uncertain, I determined to proportion the allowance so as to make our stock hold out six weeks.

I was apprehensive that this would be ill received, and that it would require my utmost resolution to enforce it; for, small as the quantity was which I intended to take away, for our future good, yet it might

might appear to my people like robbing them of life; and some, who were less patient than their companions, I expected would very ill brook it. However, on my representing the necessity of guarding against delays that might be occasioned in our voyage by contrary winds, or other causes, and promising to enlarge upon the allowance as we got on, they cheerfully agreed to my proposal. It was accordingly settled, that every person should receive one 25th of a pound of bread for breakfast, and the same quantity for dinner; so that by omitting the proportion for supper, we had 43 day allowance.

Monday, May 25. At noon some *noddies* came so near to us, that one of them was caught by the hand. This bird was the size of a pigeon. I divided it, with its entrails, into 18 portions, and it was distributed with the allowance of bread and water for dinner, and we ~~eat~~ ^{drank} ~~drank~~ ^{drank} salt water for sauce. In the evening, several *snappers* flying near to us, we had the good fortune to catch one of them. This bird is as large as a duck: like the noddy, it has received its name from seamen, for suffering itself to be caught on the masts and yards of ships. I directed the bird to be killed for supper, and the body, with the entrails, beak, and feet, I divided into 18 shares, and with an allowance of bread, considering all circumstances, we seemed to make a tolerable supper.

Tuesday, May 26. Fresh breezes from the S. E. with

with fine weather. In the morning we caught another booby, so that PROVIDENCE appeared to be relieving our wants in an extraordinary manner. My people were overjoyed at the addition to their dinner, which was distributed in the same manner as on the preceding evening, *Who shall have this?*

The weather was now serene, which, nevertheless, was not without its inconveniences, for we began to feel distress of a different kind from that which we had lately been accustomed to suffer. The heat of the sun occasioned several of our people to be seized with such languor and faintness, that life seemed intolerable. We complained all of dizzinets in the head, great weakness of the joints, and violent tenesmus; most of us having had no evacuation* by stool since we left the ship. I had constantly a severe pain at my stomach; but none of

* It was so in the case of Betty Canning, who being confined, because she would not prostitute herself, three weeks, in a cell by a gipsy woman, lived during that time upon a crust of bread and a small pitcher of water, and escaped in a most wretched condition. Other circumstances also confirm the truth of her story. It seems to prove that the bile is not the only stimulus wanted to forward the peristaltic motion of the bowels. There are some physicians (vide Shebhear's *Practice of Physic*) who believe it bears but a slight part, and upon trying experiments with animals, they find, that its natural motions are very slow, and depend almost entirely upon the operation of other stimuli, and are quick in proportion to the force of these, as is exemplified by rhubarb, jalap, salts, &c. This subject deserves further attention.

our complaints were alarming: on the contrary, every one retained marks of strength, that, with a mind possessed of a tolerable share of fortitude, seemed able to bear still greater fatigue.

May 29. We reached the coast of *New Holland*, and the joy of my men at the prospect of finding something on the shore was excessive. We returned God thanks for his gracious protection, and with much content took our miserable allowance of a 25th of a pound of bread, and a quarter of a pint of water, for dinner.

As there were no appearances to make me imagine any of the natives were near us, I sent out parties in search of supplies, while others of the people were putting the boat in order, that we might be ready to go to sea in case any unforeseen cause should make it necessary.

The parties returned, highly rejoiced at having found plenty of shells and fresh water. They had made a fire by the help of a small magnifying glass: and what was still more fortunate we found, among the few things which had been thrown into the boat and saved, a piece of brimstone and a tinder-box, so that I secured fire for the future.

The symptoms of having eat too much began to frighten some of us; but on questioning others, who had taken a more moderate allowance, their minds were a little quieted. The others, however, became equally alarmed in their turn, dreading that such symptoms (which resembled intoxication) would come on, and
that

that they were all poisoned, so that they regarded each other with the strongest marks of apprehension, uncertain what would be the issue of their imprudence. Fortunately the fruits we obtained have proved wholesome and good, of which I was soon persuaded, when I saw the birds eat them without experiencing any hurt*.

Saturday, May 30. In the morning I discovered a visible alteration in our company for the better, and I sent them away again to gather oysters. We had 38 days allowance, according to the last mode of issuing the 25th of a pound at breakfast and at dinner, and two pounds of pork left. This article, which I did not keep under lock and key as I did the bread, had been pilfered by some *inconsiderate* person, but every one denied having any knowledge of this act; I therefore resolved to put it out of their power for the future, by sharing what remained for our dinner.

While the party was out picking up oysters, I got the boat in readiness for sea, and filled all our water-vessels, which amounted to nearly 60 gallons. On this occasion, fatigue and weakness so far got the better of their sense of duty, that some of the people expressed their discontent at having work-

* This is a strong evidence of accumulated irritability in the fibre. Persons, says Dr. Beales, who have been shut up in a coal-work from the falling in of the sides of a pit, and have had nothing to eat for four or five days, will be as much intoxicated by a basin of broth, as an ordinary person by three or four quarts of strong beer.

ed harder than their companions, and declared that they would rather be without their dinner than go in search of it. One person, in particular, went so far as to tell me, with a seditious look, that, "he was as good a man as myself." It was not possible for me to judge where his might have an end, if not stopped in time; therefore, to prevent such disputes in future, I determined either to preserve my command, or die in the attempt: and, seizing a cutlass, I ordered him to take hold of another and defend himself; on which he called out: I was going to kill him, and humbly implored forgiveness. I did not allow this to interfere further with the harmony of the boat's crew, and every thing soon became quiet.

June 1. Nelson, who had been out with others in search of provisions, was obliged to be brought back, supported by two men. His complaint was a violent heat in his bowels, a loss of sight, much drougth, and an almost total inability to walk. This I found was occasioned by his being unable to support the heat of the sun, and his attempting to do more than his strength was equal to. It was not that the little wine, which I had so carefully saved, became of real use. I gave it in very small quantities, with some pieces of bread soaked in it: and he soon began to recover. The boatswain and carpenter also were ill, and complained of head-ach, and sickness of the stomach.

Towards evening I cautioned every one against making

making too large a fire, or suffering it after dark to blaze up. Mr. Samuel had the superintendence of this business, while I was strolling about the beach to observe if the light could be seen from the main. I was just assured that it could not, when on a sudden the whole country appeared in a blaze, that might have been discerned at a much more considerable distance. I ran to learn the cause, found that it was occasioned by the obstinacy and imprudence of one of the party, who, in my absence, had insisted on increasing the fire, in doing which the flames caught the neighbouring grass, and rapidly spread. This misconduct might have produced very serious consequences, by discovering our situation to the natives: for, if they had attacked us, we had neither arms nor strength to oppose an enemy. Thus the relief which I expected from a little sleep on shore was totally lost, and I anxiously waited for the flowing of the tide, that we might proceed to sea.

We had now remained just six days on the coast of *New Holland*, where we found oysters, a few mussels, some small fruits, birds*, and water. But perhaps a benefit nearly equal to this we received, by having been relieved from the irksomeness of being constantly in a crowded boat, and by obtaining good rest at night.

* Robert Lamb, when he came to *Java*, acknowledged, that, in one of the foraging parties, he had separated from his companions, and had eat nine birds raw, which he had caught.

These advantages certainly preserved our lives; and, small as the supply was, I am very sensible how much it alleviated our distresses. By this time nature would have sunk under the extremes of hunger and fatigue. Some of our men ceased to struggle for a life that only promised weakness and misery; and others, though possessed of more bodily strength, must soon have followed their unfortunate companions. Even in our present situation, we were most deplorable objects; but the hopes of a speedy relief kept up our spirits. I was secretly surprised to see that my men seemed as if they had embarked on a voyage to Timor, i. e. a vessel calculated for safety and convenience. So much confidence gave me great pleasure, and I may venture to assert, that to *this cause* our preservation is chiefly to be attributed. For my own part, incredible as it may appear, I FELT NEITHER EXTREME HUNGER NOR THIRST. My allowance contented me, knowing that I could have no more.

June 4. We were now launched into the open ocean, and I served one 25th of a pound of bread, and an allowance of water, for breakfast, and the same for dinner, with an addition of six oysters to each person.

June 5. Six oysters were, as yesterday, served to each man, in addition to the usual allowance of bread and water. In the evening, a few boobies came about us, one of which I caught with my hand. With the allowance of bread I served a quarter

quarter of a pint of water for supper, and to some, who were most in need, half a pint. In the course of the night, being constantly wet with the sea, we suffered much cold and shiverings.

June 6. At day-break I found that some of the clams, which had been hung up to dry for sea store, were stolen; but every one solemnly denied having any knowledge of it. In the afternoon, I took an opportunity of examining our store of bread, and found it containing 19 days allowance, at the former rate of serving one 25th of a pound three times a day: therefore, as I saw every prospect of a quick passage, I ventured to grant an allowance for supper, agreeable to my promise at the time it was discontinued.

June 7. We had passed the night miserably wet and cold, and in the morning I heard nothing but heavy complaints. The sea was high and breaking over us. I could only afford the allowance of bread and water for breakfast; but for dinner I gave out an ounce of dried clams to each person, which was all that remained. The sea ran very high all this day, and we had frequent showers of rain, so that we were continually wet, and suffered much cold in the night.

Mr. Ledward, the surgeon, and Lawrence Labogue, an old hardy seaman, appeared to be giving way very fast. I could only assist them by a teaspoonful or two of wine, which I had carefully saved, expecting such a melancholy necessity.

At four in the afternoon, we caught a small dolphin, which was the first relief of the kind that we obtained. I issued out two ounces to each person, including the offals, and saved the remainder for dinner the next day.

Towards evening the wind freshened, and it blew strong all night, so that we shipped much water, and suffered greatly from the wet and cold.

June 9. At day-light, as usual, I heard much complaining, which my own feelings convinced me was too well founded. I served the usual allowance of bread and water, and at noon we dined on the remains of the dolphin which amounted to an ounce per man. This afternoon I suffered great sickness from having the stomach of the fish, which had fallen to my share at dinner. At sun-set I served an allowance of bread and water for supper.

June 10. In the morning, after a very comfortable night, there was a visible alteration for the worse in many of the people; which gave me great apprehensions.

An extreme weakness, swelled legs, hollow and ghastly countenances, A MORE THAN COMMON INCLINATION TO SLEEP, with an apparent debility of understanding, seemed the melancholy pre-jages of approaching dissolution.

The surgeon and Labogue, in particular, were most miserable objects. I occasionally gave them a few tea-spoonfuls of wine, out of the little that remained, which greatly assisted them. Gannets, boobies, men of war birds, were constantly about

us. I encouraged the men with the hopes of a very few days longer, at the present rate of sailing, and we should reach Timor. This expectation was our principal support.

June 11. Every one received the accustomed allowance of bread and water, and an extra allowance of water was given to those who were most in need. In the afternoon we saw gannets, and many other birds, and at sun-set we kept a very anxious look out. . . . the evening we caught a booby, which I reserved for our dinner the next day.

Friday, June 12. At three in the morning, with an excess of joy, we discovered TIMOR, bearing W. N. W.

It is not possible for me to describe the pleasure which the blessing of the sight of this land diffused among us. It appeared scarce credible to ourselves, that in an open boat, and so poorly provided, we should have been able to reach the coast of Timor in 41 days after leaving Tofoa, having in that time run, by our log, a distance of *three thousand, six hundred, and eighteen miles*; and that, notwithstanding our extreme distress, no one should have perished in the voyage.

The day gave us a most agreeable prospect of the land, which was interspersed with woods and lawns; the interior part mountainous, but the shore low. Towards noon the coast became higher, with some remarkable headlands. We were much delighted with the general look of the country, which exhibited

exhibited many cultivated spots and beautiful situations; but we could only see a few small huts, whence I concluded that no European resided in this part of the island. Much sea ran on the shore, which made landing impracticable.

June 13. It being impossible to find any sign of settlement, we bore away to the westward, steering along shore. We had a view of a beautiful looking country, as if formed by art into lawns and parks. At two o'clock, having run through a very dangerous breaking sea, the cause of which I attributed to a strong tide setting to windward, and shoal water, we discovered a spacious bay or sound, with a fair entrance about two or three miles wide. I came to a grapple near the east side of the entrance, in a small sandy bay, where we saw a hut, a dog, and some cattle; and I immediately sent the boatswain and gunner away to the hut, to discover the inhabitants.

They returned with five Indians, and informed me that they had found two black families, where the women treated them with European politeness. They brought us a few pieces of dried turtle, and some ears of Indian corn, and offered to fetch us some other refreshments if I would wait: but we determined to push on.

We kept close to the east shore under all our sail; but, as night came on, the wind died away, and we were obliged to try at the oars, which I was surprised to see we could use with some effect.

Sunday, June 14. At one o'clock in the morning,

ing, after the most happy and sweet sleep that ever men enjoyed, we weighed, and continued to keep the east shore. The report of two cannon that were fired in the morning early gave new life to every one. We soon after discovered two square-rigged vessels and a cutter at anchor to the eastward. We endeavoured to work to windward, but were obliged to take to our oars again, having lost ground on each tack. At day-light we landed amidst a crowd of Indians, and were agreeably surprised to meet with an English sailor, who belonged to one of the vessels in the road.

The abilities of a painter, perhaps, could seldom have been displayed to more advantage, than in the delineation of the *two groups* of figures, which at this time presented themselves to each other. An indifferent spectator would have been at a loss which most to admire; the eyes of famine sparkling at immediate relief, or the horror of their preservers at the sight of so many spectres, whose ghastly countenances, if the cause had been unknown, would rather have excited terror than pity. Our bodies were nothing but skin and bones, our limbs were full of sores, and we were clothed in rags: in this squalid condition, with the tears of joy and gratitude flowing down our cheeks, the people of Timor beheld us with a mixed sensation of horror, surprise, and pity.

They ran with eagerness to procure a surgeon to dress our wounds, to get apparel to cover our nakedness, and a place suitable for our reception. The

governor, who was dying of an incurable disease, even hastened from his bed to welcome our arrival. People ran with chairs, tables, benches, and bedding, to an empty house that was assigned us. A plentiful dinner was soon laid before us: but for my own part I felt no extraordinary inclination to eat or drink. My mind kept musing on the mercy of ALMIGHTY GOD, who had made me the instrument of saving eighteen lives; and as I reflected how providentially we escaped at *Tesoa*, by the Indians delaying their attack; and that, with not more provisions than might have been consumed in five days, we crossed a sea of more than twelve hundred leagues without shelter from the inclemency of the weather; that in an open boat, with so much stormy weather, we escaped foundering; that not any of us were taken off by disease; that we had the great good fortune to pass the unfriendly natives of other countries without accident, and at last happily to meet with the most friendly and best people to relieve our distresses;—I say, when I reflected on all these wonderful escapes, the remembrance of such great mercies enables me to bear, with resignation and cheerfulness, the failure of an expedition, the success of which I had so much at heart, and which was frustrated at a time when I was congratulating myself on the fairest prospect of being able to complete it in a manner that would fully have answered the intention of his Majesty, and the humane promoters of so benevolent a plan.

That

That the state of Captain BLIGH and his company was that of ACCUMULATED IRRITABILITY, is strongly pointed out.

1st. From *one tea-spoonful* of rum producing on these poor men, benumbed as they were with cold, as much effect as *twenty times* the quantity would have on those who are warm and well fed. And indeed had it not been for the spirits having such a power to act upon men in their condition they never could have survived the hardships they experienced.

2dly. From the berries found in *New Holland* producing symptoms of *intoxication*, which would not have arisen under any other circumstances.

3dly. By the general *want* of *sleep* at first, and that which was obtained not refreshing; but, as with extreme cold, when the accumulation of irritability was such as to threaten the extinction of life, I observed, says this gallant officer, "a more than common propensity to sleep."

In the last campaign in India, when the Marquis Cornwallis was in possession of Tippoo Sultan's palace, and his gardens, at *Bangalore*, and was preparing to drive him from his capital, the indignant sultan expressed his ineffectual rage by the continual fire of cannon on our troops. As this display of his wrath could effect little, he came to Lieutenants Chalmers and Nash, with the welcome tidings of an

an intended release, and requested them to take two letters on the subject of peace, which he said he had been very anxious to obtain ever since the commencement of the war. He presented them with two shawls each, and five hundred rupees, and ordered horses and attendants to go with them to the camp. He had at this very time concerted a scheme to destroy the commander in chief of our forces, whom he thought by this expedient to lull into a treacherous security. As our allies, the Nizams, had their army stationed at some small distance from ours, he ordered a party of horse to steal between the two armies, which affecting to belong to the Nizam, asked our subjects for the *Princel* *Said*, or chief. Not suspecting them to be enemies, they pointed to his tent. These horsemen galloped immediately towards the tent, and having drawn their swords, cut down several *Mahomedans* and people in their rout. A party of sepoys having turned out with alacrity, their progress was soon illopt. Some shots were fired at them as they retreated, but they got off however, having sustained very little loss.

This scheme, says Major Diram, was one of those daring objects that have been so frequently practised by the native powers against each other in effecting revolutions in the East: and had these assassins been conducted by a guide, or their judgment been equal to their spirit in the attempt, it is possible they might have effected their murderous project. But the *Mahomedan horse*, when sent upon such

such services, are kept *fasting*, and then intoxicated with *bang*, a plant mixed with their tobacco, of which they take a large dose before they enter upon so hazardous an enterprise. This inebriation renders their exertions so wild and disunited, that it is almost impossible for them ever to prove successful against a vigilant enemy.

It was thus in former days, when the Jesuits wanted any desperate act of wickedness to be done, having pitched upon their man, they would shut him up in a large chamber lighted with a small taper no bigger than one's little finger, and hung with black cloth, on which were painted hell flames and devils, and all manner of terrible shapes. This was called the chamber of meditation: and here the person was kept meditating and *fasting* for twenty-four hours; he was then worked up to the pitch at which his employers wanted him, by an *intoxicating draught*; and, shocking as it is to tell, it is nevertheless true, that the errand on which he was sometimes sent after this preparation was MURDER.

Perhaps, says Dr. Percival, in the case of Sextus Baculus, as recorded in the Commentaries of Cæsar, the extraordinary courage and prowess which he suddenly exerted, might be aided by the *exhilarating effect* of sustenance, which, under such circumstances, it is probable he would no longer decline. He had *fasted* several days: but hearing that the enemy was entering by the gate of the fortress, he

he alone resisted the combined efforts of a superior power, until the centurions, and others, came to his assistance, who took him away from the place of contest covered with wounds.

I have been informed, adds this eminent philosopher, by a young physician from *Geneva*, that, when he was student at *Montpelier*, he fasted three days and nights with no other refreshment than pint of water daily. His hunger was keen, but never painful, during the first and second days of his abstinence; and on the third day he perceived only a faintness, when he attempted either bodily or mental exertion. A sense of coldness was diffused over his whole frame, but more particularly affected the extremities. During the whole period the alvine exertions were suppressed, and at the close of it, his skin became tinged with a shade of yellow. The first food he took was *veal broth*, which had something of an *intoxicating effect*, producing a glow of warmth, and raising his spirits, so as to render him ashamed of his dependency.

Hippocrates has very justly observed, that *children* (who possess abundant irritability), are more affected by abstinence than young persons; *these* more than the middle aged; and the *middle aged* more than old men.

Agreeable to this aphorism, Dante is said, by his countryman Morgagni, to have framed the incidents in the affecting story of Count Ugolino, a nobleman of *Pisa*, who was confined, with his four sons,

sons, in the dungeon of a tower; the key of which being cast into the river *Arno*, they were in this horrible situation starved to death. And they are represented by the poet, as dying at different periods, according to their respective ages.

Now the fourth morning rose; th. youngest child
 Fell at his father's feet, in accent wild,
 Struggling with pain, with his last fleeting breath,
 "*Help me, my fire,*" he cried, and sunk in death.
 He saw the others follow one by one—
 I heard their last scream,—and their expiring groan.

S E C T. XIII.

OF ASPHYXIA FROM FAMINE.

IN our attempts to recover those who have suffered under the calamities of FAMINE, great circumspection is required. Warmth, and cordials, are the means usually employed; and it is evident that these may prove too powerful in their operation, if not administered with caution and judgment. For the body, by *long fasting*, as we have seen, is reduced to a state of *extreme irritability*; the minuter vessels of the brain, and of other organs, collapse for want of fluids to distend them; the stomach and intestines shrink in their capacity; and the pulsations of the heart and arteries are quick and feeble, with scarce sufficient energy to propel the scanty current of blood. Under such circumstances there are instances of persons who have been suddenly struck dead in consequence of having took a *full meal*, and drank a *glass of brandy*. As with those who have been *frost-bitten*, or *drowned*, friction with *snow* or *cold water* is the only safe *stimulus* that can at first be applied to the surface. Here the *lowest stimulus* in the scale is to be preferred to that *sudden transition* too often practised by *unphilosophic* practitioners. The external heat, says Dr. Percival, should be at first lower than that of the human body, and gradually

dually increased, according to the effects of that stimulus. Whey, gruel, weak broth, is the only nourishment that can with propriety be administered. If cordials are employed, they should be given with the most frugal hand, and considerably diluted. Perhaps wine whey might be better, and when the *superfluous irritability* is a little worn off, and the stomach strengthened, an egg may be mixed with the whey, or administered under some more agreeable form. But let it be remembered as an indubitable maxim, adds Dr. Percival, "*that the return to a jejunal diet should be conducted with great caution, and by very slow gradations.*"

OUR
RELATIONSHIP
TO
REST.

VOL. III.

N

S E C T. XIV.

OF REST FROM ACTION.

Sleep and *wakefulness* bear a great resemblance to *exertion* and *rest*; as *wakefulness* is the natural state of *action*, in which the animal machine is fatigued and wasted, and *sleep* the state of *ease*, in which it is refreshed and repaired. Thus we may look upon the time of being *awake* and *active* as the time of wearing out the animal frame; and the time of *sleep* and *rest*, as that in which it is repaired and recruited; for, in action, the *irritable principle* is continually taken from the muscular fibres, which cannot otherwise be replaced than by *rest*.

I. Of Voluntary Action.

Not only the *will*, by which the electric fluid is sent into the muscles, but the *muscles* themselves, seem, as it were, to get fatigued by exertion, and require a certain time to recruit their powers: for in every contraction of a fibre, there is an expensiture of the *irritable principle*; and where the exertion of the voluntary powers has been for some time increased, and the muscles or organs of motion have in consequence acted with greater energy, their propensity to activity is proportionally lessened; which can be ascribed to nothing else but the *exhaustion* or *diminution* of the *irritable* *principle*.

PLE. Indeed every one must have experienced the refreshment arising from *reposé*, and it is an established fact, that for a horse to perform a long journey, he should be previously kept at rest for several days in the stable.

Upon waking after profound sleep we stretch our limbs, which arises from the *accumulation* of the *irritable principle* in the fibres. From the same cause, when the muscles of our face have been long in a state of inaction, we yawn: and children and young animals, who have abundant irritability, are impatient of confinement, and seem never easy but in a change of position.

* 2. Of Involuntary Action.

After animal fibres have for some time been exerted into contraction, a *relaxation* succeeds, even though the exciting cause continues to act. In respect to the *irritative motions* this is exemplified in the peristaltic contractions of the bowels, and the beatings of the heart; which cease and are renewed alternately, though the stimulus of the aliment and blood continue to be uniformly applied: in *sensitive motions*, as in fits of the stone and gravel, and in parturition, though the stimulus is perpetual. In our *muscular exertions* it is experienced, as no one can hang long by the hands, however vehemently he wills so to do; and the changes of our attitude evinces the necessity of relaxation to those muscles which have been long in action.

S E C T. XV.

OF SLEEP.

THOUGH man in his sleeping state is a much less perfect animal than in his waking hours, and though he consumes more than one third of his life in this his irrational situation, yet is the wisdom of the AUTHOR of NATURE manifest even in this seeming imperfection of his work.

It was before shewn that the application of *stimuli* after a certain time *exhausts* the IRRITABILITY, or EXCITABILITY, of the system. To *recruit* *which* *loss*, the all-wise and merciful CREATOR has instituted the season of SLEEP, at which time the stimuli of external objects are excluded by the *silence* and the *darkness* of the night; and as *cold* * accumulates the irritability of the fibre, it is wisely fore-ordained that this season shall be accompanied with a *suitable* degree of *cold*. Common or ordinary sleep, produced by the application and action of stimuli, from what has been said, seems therefore to be a state, the result of a law of the animal economy, which takes place in order to remove the effects of

* Hence the evil of *feather-beds* and fires in our bed-chambers; for we should court no more than a *suitable degree* of *warmth*.

stimuli, and to *refore*, as much as possible, the *excitability* of the system; as during this state the stimulus of vibration is suspended, all external objects cease to make impression, even cathartics lose their powers of action, while the *atmospheric air* is almost the only external power, which then continues to be applied, at once carrying off what is excrementitious from the lungs, as it affords probably to the system that *principle* which is expended by the various actions of life.

Beside the very great quantity of the *IRRITABLE PRINCIPLE* perpetually *expended* in moving the arterial, venous, and absorbent systems, and the other organs of the body; there is also, during our waking hours, a *constant expenditure* of it by the action of our locomotive muscles and organs of sense. Thus the optic nerves, where they enter the eye, and the great expansion of the nerves of touch beneath the whole of the cuticle, evince the *great consumption* of the *IRRITABLE PRINCIPLE* by these senses. And our perpetual muscular action in the common offices of life, and in constantly preserving the perpendicularity * of our bodies during the day, evince

* When any person loses the power of muscular action, whether he is erect or in a sitting posture, he sinks down upon the ground; as is seen in fainting fits, and other instances of great debility. Hence it follows, that *some exertion of muscular power* is necessary to preserve our *perpendicular attitude*. This is performed by proportionally exciting the

evinced a considerable *expenditure* of the IRRITABLE PRINCIPLE by our locomotive muscles. It follows, therefore,

the antagonist muscles of the trunk, neck, and limbs; and if at any time in our locomotions we find ourselves inclining to one side, we either restore our *equilibrium* by the efforts of the muscles on the other side, or by moving one of our feet extend the base which we rest upon to the new centre of gravity. But the most easy and habitual manner of determining our want of perpendicularity, is by attending to the *apparent motion* of the objects within the sphere of distinct vision. Hence no one who is hood-winked can walk in a straight line for a hundred steps together; for he inclines so greatly, before he is ware of his want of perpendicularity, not having the apparent motions of ambient objects to measure this inclination by, that he is necessitated to move one of his feet outwards, to the right or to the left, to support the new centre of gravity, and thus errs from the line he endeavours to proceed in. Thus any one who stands alone on the top of a high tower, if he has not been accustomed to balance himself by objects placed at such distances and with such inclinations, begins to, and endeavours to recover himself. During this time the apparent motion of objects at a distance below him is very great, and the impressions of these apparent motions continue a little time after he has experienced them; and he is persuaded to incline the contrary way to counteract their effects; and either immediately falls, or applying his hands to the building, uses them to preserve his perpendicular attitude, contrary to the erroneous persuasions of his eyes. Thus on horseback we accurately observe another person, whom we meet trotting towards us, without confounding his jumping and progressive motion with our own, because we have been accustomed to them both; that is, to undergo the one, and to see the other at the same time. But in riding over a broad and fluctuating stream, though we are well experienced

therefore, or if the exertion of these organs of sense and muscles be for a while *intermitted*, that a *large quantity* of the IRRITABLE PRINCIPLE must be *accumulated*.

As soon as a person begins to sleep (as in *hemiplegia*, where the *limbs* on *one side* have lost their power of voluntary motion, and the patient is for many days employed in moving those of the *other*, or as when in the *cold fit* of an intermittent fever some parts of the system have for a time continued *torpid*, and have thus expended less than their usual expenditure of the IRRITABLE PRINCIPLE), a *hot fit* succeeds; so, owing to *the suspension* of the voluntary actions, the peristaltic motion of the intestines, and the exclusion of the strong stimulus of mental exertion, an *accumulation* of the IRRITABLE PRINCIPLE takes place during sleep, and the blood-vessels and absorbents have in consequence an increased action, and hence the nutriment is with great energy forced over every part of the system to repair the wastes of the preceding day: for it is probable that *nutrition* is almost entirely performed in SLEEP; and

on the motions of our horse, we are liable to become dizzy from our inexperience in that of the water. And when we first go on ship-board, where the movements of ourselves, and the movements of the large waves are both new to us, the *vertigo* is almost unavoidable with the terrible sickness which attends it, and after we come from on ship board, being used to reel about to maintain our perpendicularity, we have at first the same drunken gait as we had on ship-board,—Dr. DARWIN.

that

that young animals grow more at this time than in their waking hours, as young plants have long since been observed to grow more in the night, which is generally their time of sleep. Hence also the *beat* of the system is gradually increased, and the extremities of feeble people, which had been cold during the day, become warm, while in others sweats are so liable to break out towards morning *.

* Dr. Darwin.

PRACTICAL OBSERVATIONS.

S E C T. XVI.

METHODS OF INDUCING SLEEP

FROM the foregoing *Section* we have learnt, that *night* is the time adapted for *sleep*; and from the *Section on Habit* *, may learn the propriety of *going to bed* and *rising* at a *certain hour*.

We have seen how this state is produced by the proper application of stimulant powers during the day, and since it is to accumulate irritability in the system, the chambers in which we sleep ought therefore to be *silent*, *dark*, and *moderately cold*; and since the *chief refreshment* of *sleep* arises chiefly from the *oxygen*, or *vital*, *air*, imbibed by the system, forming a part of the *digestive process* then going on, we should be cautious how we are surrounded by *unclean*.

In the state of nature; when the sense of hunger is appealed by the stimulus of agreeable food, and the business of the day is over, the human savage, at peace with the world, then exerts little attention to external objects; pleasing reveries of his successes in hunting succeed, and at length sleep is the

* Vide the *Section on Habit* at the end of Vol. IV.

result:

result: till the system is recruited, and he awakes with fresh vigour.

In like manner the poor sleep little, forced, by their situation, to lengthen out their labour to their necessities, they however go to bed early in the evening, the irritable principle being exhausted by the labours of the preceding day, and they get up refreshed at sun-rise, and accumulate again fresh irritability by the coolness of the morning *. The blooming complexion of our peasantry, the permanence of their good looks, and their strength and activity, compared with the sickly visage and ailing constitutions of the Sons of Luxury, who turn night into day and sleep in beds of down, with large fires in their rooms, clearly demonstrate which mode of life is most conducive to health. *

It is justly said by Dr. Mackenzie, that he who sleeps long in the morning, and sits up late at night, hurts his constitution without *gaining time*; and he who will do it merely in compliance with the fashion, ought not to repine at a *fashionable state of bad health*.

Sleep, tired Nature's sweet restorer, cannot be safely dispensed with. Study, protracted far into the hours of night, *cares harboured*, and even very *late hours* in company, by encroaching on the hours

* Even Dr. Cullen, in his last work, expresses himself with a precision that is not frequently found in his theoretical writings. *A state of sleep, says he, subsisting for some time, induces a state of the system more ready to be affected by stimuli of all kinds.* *Mat. Medica*, 1782, 223.

adapted for sleep, are sure to lay the foundation of many dreadful diseases.

If *sleep* does not pay the accustomed visit, the whole frame of man will in a short time be thrown into disorder; his appetite ceases; his spirits are dejected; and his mind, abridged of its slumbering visions, begins to adopt waking dreams. A thousand strange phantoms arise, which come and go without his will: these, which are transient in the beginning, at last take firm possession of the mind, which yields to their dominion, and, after a long struggle, runs into confirmed madness or death. But it is happy for mankind, that this state of inquietude is seldom driven to an extreme. However many find it more difficult to procure sleep than any other animal, and some are obliged to court its approaches for several hours together, before they incline to rest. It is in vain that all light is excluded, that all sounds are removed; that books of entertainment are read; the *restless* and *busy mind* still retains its former activity; and Reason, that wishes to lay down the reins, in spite of herself, is obliged to maintain them. This is strongly instanced by Shakepeare in the soliloquy of King Henry.

How many thousand of my poorest subjects
Are at this hour asleep!—O! gentle sleep,
Nature's soft nurse, how have I frighed thee,
That thou no more wilt weigh my eye-lids down,
And steep my senses in forgetfulness?

Why,

Th' Immortals' number'd on their thrones above,
All but the *care-wakeful* eyes of JOVE.

To honour I neer' son, he bends his care,
And plunge the *Greeks* in all the woes of war:
Then bids an empty phantom rise to fight,
And thus commands the vision of the night.

Fly hence, deluding dream! and light as air,
To AGAMEMNON's ample tent repair.
Bid him in arms draw forth th' embattl'd train,
Lead all his *Grecians* to the dusty plain.

Swift as the word the vain illusion fled,
Descends, and hovers o'er ATREUS' head;
Cloth'd in the figure of the *Pylian* sage,
Renown'd for wisdom, and rever'd for age:
Around his temples spreads his golden wing,
And thus the flatt'ring dream deceives the king.

Canst *thou*, with all a monarch's cares oppress,
Oh ATREUS' son! canst *thou* indulge thy rest?
Ill fits a chief who mighty nations guides,
Directs in council, and in war presides,
To whom its safety a whole people owes,
To waste long nights in indolent repose.
Monarch, awake! 'tis Jove's command I hear,
Thou, and thy glory, claim his heav'nly care.
In arms draw forth th' embattl'd train,
Lead all thy *Grecians* to the dusty plain;

See—

The phantom, said, then vanish'd from his sight,
Resolves to air, and mixes with the night.

In the case of Lord Lyttelton*, the *want of sleep* is attributed as the cause of his death. *Intense thought* puts the brain into a state more or less unapt for rest, and a multitude of facts, in the ingenious tract of Tissot on the Diseases of *Literary Characters*, prove, that the aptitude of the brain, to restore by sleep, the impaired energies of the corporeal functions, may be lost altogether. Much it imports, therefore, the *studious*, to limit their learned labours to proper hours, to support strength by intervals of exercise in the open air, and to *all others* to solicit sleep by a seasonable dismissal of business and of care.

As the *immediate cause* of sleep consists in the *suspension of volition*, it follows, that whatever *diminishes* the general quantity of the *irritable principle*, or *diverts it* from the faculty of *volition*, will constitute a *remote cause* of sleep;—such as fatigue from muscular or mental exertion, which diminishes the general quantity of the *irritable principle*,—or by increasing of the action of the vascular and absorbent systems, as are the effects of opium, wine, food, &c. which not only by their expenditure of the *irritable principle*

* Dr Johnston says of this nobleman, that he was “*luculentus nobilitissimus: inter nobiles spectabilissimus, inter utrosque optimus: ut enim antiquam generis claritatem eruditione, Pruditionem, miro vitæ candore decoravit; sic his omnibus, omnia pulcherrimam apicem, et coronationem addidit, admirabilem animi modestiam.*” *Vide Disquisitiones relative to the Nervous System, p. 214.*

diminish the quantity of volition, but also their producing pleasurable sensations (which occasion other muscular and sensual motions in consequence) doubly decrease the voluntary power, and thus more forcibly produce sleep:—or lastly, an increase of the sensitive motions, as by attending to soft music, which diverts the *irritable principle* from the faculty of volition.

Boerhaave on some occasions, in order to procure sleep for his patient, directed water to be placed in such a situation so as continually to drop on a brass pan.

Fontesque lymphis obstrepuunt manantibus,
Somnos quod invitet leves.——Hor.

Another method of inducing sleep, says the illustrious Dr. Darwin, is delivered in a very ingenious work lately published by Dr. Beddoes, who, lamenting that *opium* frequently occasions restlessness, thinks, “that in most cases it would be better to induce sleep by the *abstraction of stimuli*, than by *exhausting the excitability*,” and adds, “upon this principal we could not have a better soporific than an atmosphere with a diminished proportion of oxygen, or vital air, and that common air might be admitted after the patient was asleep.”

In a subsequent work, this ingenious physician says, I had formerly been led to infer “*that an atmosphere, with a diminished proportion of oxygen, would be in some cases a better soporific than any*

we at present possess, and I have since received confirmation of this opinion."

A person in a consumption, who for months had taken *opium* at night, slept perfectly well without *opium* when he came to respire HYDROGEN GAS; his sleep he remarked to be more profound than usual. The air of his room being loosely mixed with HYDROGEN GAS, his servant, a very bad sleeper, declared that he did not know what was come to him, he slept so sound. This man necessarily inspired much HYDROGEN GAS from attendance on his master. In two consumptive patients, I am able to induce sleep almost at pleasure by the HYDRO-CARBONIC AIR*. In a great majority of such cases, it is well known that the nights are exceedingly disturbed in spite of *opium* freely administered. The soporific virtue of HYDRO-CARBONATE seems, however, from the experience I have had, by no means confined to consumption.

The analogy which obtains between *sleep* and the state of *torpor*, is so striking, and at the same time so applicable to the present subject, that it seems to deserve more attention than has yet been bestowed upon it.

The class of *dormant animals*, say the celebrated natural historian, M. de Buffon, are not, as vulgarly imagined, in a state of absolute *sleep*, for the respiration is scarce perceptible, and the blood is cold,

* A mixture of fixed and inflammable airs.

or scarcely exceeds the temperature of the outward air. There is little reason then to wonder why these animals, so inferior comparatively to others in point of heat, should become torpid, as soon as their own small portion of internal heat ceases to be assisted by the external warmth of the air: a circumstance which naturally happens when the thermometer is not more than 10 or 11 degrees above congelation. The same extends to all torpid animals during the winter. Alike are its effects on the dormouse, the hedge-hog, and the bat. Of this class the *marmot* is the most remarkable, which delights in the regions of ice and snow, and is never found but on the highest mountains: it, nevertheless, of all others is the most liable to be rendered torpid by cold.

This animal, though extremely active in summer, lays up no provision for the winter, because such a precaution would be useless during its dormant state. But when he perceives the fall approaches of the season, in which his vital motions are to continue in a great measure suspended, he closes up the apertures of his subterraneous dwelling with such solidity, that it is more easy to open the earth

* The *bees*, which were transported to Barbadoes, and other western islands, ceased to lay up honey after the first year, and became very troublesome; but those in Jamaica continued to make honey, as the cold north winds, or rainy seasons of that island, confine them at home for several weeks together.—
Dr. Darwin.

any where else, than where he has closed it. When their retreat is discovered, they are found, each *rolled into a ball*, and apparently *lifeless*. In this state, they may be dragged *roughly* along the ground, or even killed, without testifying any sense of pain.

By a *mild and gradual heat alone* are they to be recovered from this torpor, and if brought suddenly before a *fire*, they *perish*. A few degrees above the tenth or eleventh degree are sufficient to re-animate them; and if they are kept in a *warm* place during the winter, they do not become torpid, but continue as lively as at any other time. If the marmot remains longer torpid than the dormouse, it is probably because the weather of the climate is longer cold.

It is curious, adds M. de Buffon, to observe this animal, when he is prematurely forced to pass from the torpid to an active state. He first yawns, fetches a deep sigh, and utters broken inarticulate sounds like a drunken man. His limbs become less rigid. He stretches out his legs, fetches another still deeper sigh, opens his eyes, and at length recovers. Such are the uneasy sensations he visibly undergoes, from a sudden and forced re-animation; which is probably performed in a more gentle and imperceptible way by the vernal warmth, when left in his cell.—*But what is singular, he never becomes torpid, though exposed to a degree of cold equal to that of freezing, provided he is kept in the open air instead of a close place.*

INDIRECT MENTAL STIMULI.

SECT. XVII.

DARKNESS.

HAVING before treated of direct nervous stimuli, and their effect in strengthening the fibrous and nervous powers, when in due quantity, and now we have shewn that the nervous system was, in this respect, obedient to nearly the same laws as the fibrous, we are arrived now at that part of our subject which treats of *indirect nervous stimuli*, which we shall find to accumulate *nervous* or *sensorial energy*.

That the *nervous power* is accumulated by defect of sensorial action, we have the most striking example in *vision*. It is, indeed, surprising how far the eye can accommodate itself to darkness, and make the best of a gloomy situation. When first taken from light and brought into a dark room, all things disappear; but after a few minutes the pupil dilates, and the optic nerve having accumulated sufficient sensorial power, many objects may be discerned.

Xenophon,

Xenophon, in his account of the retreat of the ten thousand, mentions that the Persians and Greeks had always lights in their camps: but as they traversed Thrace, the King Scuthes had lights around his camp, which kept him concealed, and enabled him to perceive any person who should have the boldness to reconnoitre his camp, whereas the Persians and Greeks could only discover the spy in the camp itself—The reason of this is explained only upon this principle.

There was a gentleman of great courage and undauntedness, who was a major under King Charles I. This unfortunate man, sharing in his master's misfortunes, and being forced abroad, ventured, at Madrid, to do his king a signal service; but, unluckily, failed in the attempt. In consequence of this, he was instantly ordered to a dark and dismal dungeon, into which the light never entered, and into which there was no opening but by a hole at the top, down which the keeper put his provisions, and presently closed it again on the other side. In this manner the unfortunate loyalist continued for some weeks, distressed and disconsolate; but, at last, began to think he saw some little glimmering of light. This internal dawn seemed to increase from time to time, so that he could not only discover the parts of his bed, and such other large objects, but, at length, he even began to perceive the mice that frequented his cell, and saw them, as they ran about the floor, eating the crumbs that happened

to fall. He formed here an acquaintance with a spider, whose motions he observed, which was his chief amusement. After some months in this confinement he was set at liberty; but such was the effect of the darkness, and so great the accumulated irritability of the optic nerve, that he was obliged to remain shut up for some time after, and accustom himself by degrees to the light*.

* GOLDSMITH.

SECT. XVIII.

THE DISCOVERY.

The divine author of the Christian religion, addressing the multitude, who were offended at his sitting down at table with publicans and sinners, asks them, What woman, who hath ten drachmas, if she lose one, doth not light a lamp, sweep the house, and search carefully until she find it? And having found it, doth she not assemble her friends, saying, "Come, rejoice with me, for the drachma, which I had lost, I have found?" *Such is the joy of the angels in heaven when one sinner repenteth.*

He further said. A certain man had two sons, and the younger of them requested his father to give him a portion of his estate, and he allotted to both of them his share. Soon after, the younger son collected together all he possessed, and travelled into a distant country, and wasted all his substance in riot. When all was spent a great famine came upon that land, and he began to be in want. Then he applied to one of the inhabitants of that country, who sent him into his fields to keep swine: And he was happy to fill his belly with the husks on which the swine were feeding: so no one gave him aught:

At length reflecting within himself, he said, "How many hirelings hath my father, who have all more meat than sufficeth them, while I perish with hunger? I will arise and go to my father, and will say unto him, Father, I have sinned against heaven and against thee, and am no more worthy to be called thy son, make me as one of thy servants." And he went to his father. When he was yet afar off, his father saw him, had compassion on him, ran towards him, threw himself upon his neck, and kissed him. And the son said, "Father I have sinned against heaven and against thee, and am no more worthy to be called thy son." But the father called to his servants and ordered them to bring *a choice robe*, and put it upon him, and shoes on his feet, and to kill the *fatted calf*. "Let us," says he, "eat and be merry; FOR THIS MY SON WAS DEAD, AND IS ALIVE AGAIN: HE WAS LOST, AND IS FOUND."

When the elder brother heard music and dancing, and had learnt the cause of it, he expostulated with his father, who answered, "Son, thou art always with me. My kindness to you has never ceased. Is it not *reasonable* (i. e. a law of our nature) that we should *rejoice* and be *merry*, because THIS THY BROTHER WAS DEAD, AND IS ALIVE AGAIN; HE WAS LOST, AND IS FOUND?"

He also addressed this other parable to them. What man among you, who hath an hundred sheep, if he lose one, doth not leave behind the ninety and nine

nine to go in search after that which is lost until he find it? And having found it, doth he not *joyfully* lay it upon his shoulders; and, when he is come home, assemble his friends and neighbours, saying unto them, "*Rejoice with me, for I HAVE FOUND MY SHEEP WHICH WAS LOST!*" Thus, I say unto you, *that* there is among the angels in heaven GREATER JOY on account of one sinner who repenteth, than from beholding the good conduct of ninety and nine persons who need no reformation.

From this passage of holy writ it would appear, that the same law of *contrast*, as *heightening all enjoyment*, extends equally to *angels* as to mortal-men.

S E C T. XIX.

THE SAME SUBJECT CONTINUED

EDGAR.

Give me a brief tale,
 And when tis told, O, that my heart would burst! —
 The bloody proclamation to escape,
 That follow'd me so near, O, our lives sweetness!
 That we the pain of death would hourly bear
 Rather than die at once, taught me to shift
 Into a madman's rags; t' assume a semblance,
 The very dogs disdain'd; and in this habit
 Met I my father, with his bleeding rings,
 Their precious gems new lost; became his guide,
 Led him, begg'd for him, sav'd him from despair:
 —Never,

---Never, O fool ! reveal'd myself unto him,
 Until some half hour past, when I was arm'd,
 Not sure, tho' hoping of this good success,
 I ask'd his blessing, and from first to last
 Told him my pilgrimage. But his *flaw'd heart*,
 Alack, too weak the conflict to support,
 "Twixt two extremes of passion, *joy and grief*,
Burst smilingly.

SHAKESPEARE

SECT. XX.

LOSS.

---It so falls out,
 That what we prize not to the worth,
 While we enjoy it ; but being lack'd and lost,
 Why then we *rack the value* : then we know
 The virtue that possession would not
 Shew us whilst it was ours.

SHAKESPEARE.

S E C T. XXI.

G R I E F.

OTHELLO sets sail with *Desdemona* for *Cyprus*, when a violent storm arises. They however arrive safe. Enter *Othello*.

Oth. Oh, my fair warrior.

Des. My dear *Othello*.

Oth. It gives me wonder, great as my content,
To see you here before me. O my soul's joy!
If *after every tempest* comes such calm,
May the winds blow till they have weaken'd
death:

And let the labouring bark climb hills of seas
Olympus high; and duck again as low
As hell's from heav'n; if I were now to die,
'Twere now to be *most happy*; for I fear
My soul hath her content *so absolute*,
That not another comfort like to this
Succeeds in unknown fate.

Livy relates, that two women, who supposed their sons dead, upon seeing them return unhurt, after the battle of Thracymene, died from excess of emotion. One, says he, at the very gate, being surprised at the sudden arrival of her son, expired in his arms, the other, to whom the death of her son had been falsely announced, sorrowing at the step of her house, died upon seeing her son return alive.

S E C T.

SECT. XXII.

S U R P R I S E.

Ire amantium amoris integratio est.

ANGELINA.

- “TURN, gentle Hermit of the dale,
 “And guide my lonely way
 “To where yon taper cheers the vale
 “With hospitable ray.
 “For here forlorn and lost I tread,
 “With fainting steps and slow;
 “Where wilds, immeasurably spread,
 “Seem length’ning as I go.”

THE HERMIT.

- “Forbear, my son,” the Hermit cries,
 “To tempt the dangerous gloom;
 “For yonder faithless phantom flies
 “To lure thee to thy doom.
 “Here to the houseless child of want
 “My door is open still;
 “And though my portion is but scant,
 “I give it with good will.
 “Then turn to-night, and freely share
 “Whate’er my cell bestows;
 “My rushy couch and frugal fare,
 “My blessing and repose.

“No

- " No flocks, that range the vales, free,
 " To slaughter I condemn:
 " Taught by that Power that pities me,
 " I learn to pity them:
 " But from the mountain's grassy side
 " A guiltless feast I bring;
 " A scrip with herbs and fruits supply'd,
 " And water from the spring.
 " Then, pilgrim, turn, thy cares forego;
 " All earth-born cares are wrong;
 " Man wants but little here below,
 " Nor wants that little long."

Soft as the dew from heaven descends,
 His gentle accents fell:
 The modest stranger lowly bends,
 And follows to the cell.

Far in a wilderness obscure
 The lonely mansion lay;
 A refuge to the neighb'ring poor,
 And strangers led astray.

No stores beneath its humble thatch
 Requir'd a master's care;
 The wicket, op'ning with a latch,
 Receiv'd the harmless pair.

And now, when busy crowds retire
 To take their evening rest,
 The Hermit trimm'd his little fire,
 And cheer'd his pensive guest:

And

And spread his vegetable store,
 And gaily pick, and snail'd;
 And, skill'd in legendary lore,
 The lingering hours beguil'd.

Around, in sympathetic mirth,
 Its tricks the kitten tries;
 The cricket chirrups in the hearth;
 The crackling faggot flies.

But nothing could a charm impart
 To sooth the stranger's woe;
 For grief was heavy at his heart,
 And tears began to flow.

His rising cares the Hermit spy'd,
 With answering care oppress'd:

THE HERMIT.

" And whence, unhappy youth!" he cry'd,
 " The sorrows of thy breast?
 " From better habitations spurn'd,
 " Reluctant dost thou rove:
 " Or grieve for friendship unreturn'd,
 " Or unregarded love?
 " Alas! the joys that fortune brings,
 " Are trifling and decay;
 " And those who prize the paltry things,
 " More trifling still than they.
 " And what is *friendship* but a name,
 " A charm that lulls to sleep;
 " A shade that follows wealth or fame,
 " And leaves the wretch to weep?

" And

- “ And *love* is still an earnest friend,
 “ The haughty *surge*’s jest:
 “ On earth unseen, or only found
 “ To warm the turtle’s nest.
 “ For shame, fond youth, thy sorrows hush,
 “ And spurn the sex,” he said:
 But while he spoke, a *rising blush*
 His *love-lorn* guest *betray’d*.

ANGELINA.

- “ And, ah, forgive a stranger rude,
 A wretch forlorn,” she cry’d;
 “ Whose feet unhallow’d thus intrude
 “ Where heaven and you reside.
 “ But let a maid thy pity share,
 “ Whom love has taught to stray;
 “ Who seeks for rest, but finds despair
 “ Companion of her way.
 “ My father liv’d beside the Tyne,
 “ A wealthy lord was he;
 “ And all his wealth was mark’d as mine,
 “ He had but only me.
 “ To win me from his tender arms,
 “ Unnumber’d suitors came,
 “ Who priz’d me for imputed charms,
 “ And felt or feign’d a flame.
 “ Each now a mercenary crowd
 “ With richest proffers strove,
 “ Among the rest young Edwin bow’d,
 “ But never talk’d of love.

“ In

" In humble, simplest habit clad,
 " No wealth or power had he;
 " An honest heart was all he had,
 " But that was all to me.

" The blossom opening to the day,
 " The dews of heaven refin'd,
 " Could nought of purity display,
 " To emulate his mind.

" The dew, the blossoms of the tree,
 " With charms inconstant shine;
 " Their charms were his, but, woe to me,
 " Their constancy was mine.

" For still I try'd each fickle art,
 " Importunate and vain;
 " And while his passion touch'd my heart,
 " I triumph'd in his pain.

" Till, quite dejected with my scorn,
 " He left me to my pride;
 " And sought a solitude forlorn
 " In secret, where he dy'd,

" But mine the sorrow, mine the fault,
 " And well my life shall pay;
 " I'll seek the solitude he sought,
 " And stretch me where he lay.

" And there forlorn, despairing hid,
 " I'll lay me down and die:
 " 'Twas so for me that Edwin did,
 " And so for him will I."

" Forbid

“ Forbid it, heaven!” the Hermit cry’d,
 And clasp’d her to his breast:
 The wondering fair-one turn’d to chide;
 ’Twas Edwin’s self that prest.”

EDWIN.

“ Turn, Angelina, ever dear,
 “ My charmer, turn to see
 “ Thy own, thy long-lost Edwin here,
 “ Restor’d to love and thee.
 “ No, never, from the hour to part.
 “ We’ll live and love to part.
 “ The sigh that rends my contrite heart,
 “ Shall teach thy brother’s love.”

“ The passion the painter would endeavour to express
 he would be *restray*, or joy heightened by the contrary
 emotion

SECT. XXIII.

ABSENCE.

ROCHEFOUCAULT has very well remarked, that *absence* destroys weak passions, but increases strong, as the wind extinguishes a candle, but blows up a fire. Long *absence* naturally weakens the idea, and diminishes the passion: but where the affection is so strong and lively as to support itself, the uneasiness arising from *absence*, says Flume, certainly increases the passion, and gives it new force and influence.

THOMAS.

- " Let fops pretend in flames to melt,
- " And talk of pangs they never felt ;
- " I speak without disguise or art,
- " And with my hand bestow my heart."

SALLY.

- " Let ladies prudishly deny,
- " Look cold, and give their thoughts the lie ;
- " I own the passion in my breast,
- " And long to make my lover blest."

THOMAS.

- " For this the sailor on the mast,
- " Endures the cold and cutting blast,
- " All dripping wet wears out the night,
- " And braves the fury of the fight."

SALLY.

SALLY.

" For this the virgin pines and sighs,
 " With throbbing heart, and streaming eyes,
 " Till sweet reverse of joy she proves,
 " And clasps the faithful lad she loves *."

* Absence however may be too long, and then, instead of being an *indirect stimulus*, will exhibit its *sedative effect*. Hence people go abroad to overcome the passion of love; or,

As when some youth of firm and constant mind,
 Who long in climes remote had absent pin'd;
 And, after many a year of toil and care,
 Returns impatient to review the fair,
 Whom still he hopes to find the same
 Fresh blooming object of his youthful flame;
 But sees, alas! that time's relentless pow'r
 Has chang'd the blossom to a faded flow'r;
 For radiant locks, that wav'd in ringlets gay,
 Sees rugged tresses verging fast to gray;
 For eyes, whose glance illumin'd all around,
 Dull lifeless lamps, in wat'ry dimness drown'd;
 For cheeks, which glow'd with beauty's rosy pride,
 A wan complexion, and a shrivell'd hide——
 One tender word he scarce has pow'r to say,
 But turns with *horror* from the sight away.

S E C T. XXIV.

PRETENDED ANGER.

POOR artless maid ! to stain thy spotless name,
 Expence, and art, and toil, united strove ;
 To lure a breast that felt the purest flame,
 Sustain'd by virtue, but betray'd by love.

School'd in the science of love's mazy wiles,
 He cloth'd each feature with *affected scorn* ;
 He spoke of *jealous doubts*, and *fickle smiles*,
 And, feigning, left her *anxious* and *forlorn*.

Then, while the FANCY'D RAGE alarm'd *her care*,
 Warm to deny, and zealous to disprove ;
He bade his words the WONTED SOFTNESS wear,
And seiz'd the minute of RETURNING LOVE.

Six envious moons matur'd her growing shame ;
 As yet to flaunt it in the face of day ;
 When scorn'd of virtue, stigmatiz'd by fame,
 Low at his feet desponding JESSY lay.

" HENRY," she said, " by thy dear form subdu'd,
 " See the sad relics of a nymph undone !
 " I find, I find this rising sob renew'd,
 " I sigh in shades, and sicken at the sun.

" Amid

" Amid the dreary gloom of night, I cry,
 " When will the morn's once pleasing scenes re-
 " turn ?

" Yet what can morn's returning ray supply,
 " But foes that triumph, or but friends that mourn ?

" Alas ! no more that joyous morn appears
 " That led the tranquil hours of spotless fame !
 " For I have steep'd a father's couch in tears,
 " And ting'd a mother's glowing cheek with shame.

" The vocal birds that raise their matin strain,
 " The sportive lambs increase my pensive moan ;
 " All seem to chase me from the cheerful plain,
 " And talk of mirth and innocence alone.

" If thro' the garden's flow'ry tribes I stray,
 " Where bloom the *Jasmin* that could once allure,
 " Hope not to find delight in us, they say,
 " For we are spotless, JESSY ; we are pure.

" Now the grave old alarm the gentler young ;
 " And all my name's abhor'd contagion flee ;
 " Trembles each lip, and falters every tongue,
 " That bids the morn propitious smile on me.

" Thus, for your sake, I shun each human eye ;
 " I bid the tweets of blooming youth adieu ;
 " To die I languish, but I dread to die,
 " Lest my sad fate should nourish pangs for you.

“ Raise me from earth ; the pains of want remove,
 “ And let me silent seek some friendly shore ;
 “ There only, banish’d from the form I love,
 “ My weeping virtue shall relapse no more.”

She spoke,—but he was born of savage race,
 Nor would his hands a niggard boon assign,
 He left her—torn from every earthly friend ;
 Oh ! his hard bosom, which could bear to leave !

“ Yes, I will go, where circling whirlwinds rise,
 “ Where threat’ning clouds in tale grandeur lower,
 “ Where the blasts yell, the liquid columns pour,
 “ And madd’ning billows combat with the skies !

“ Oh ! dreadful solace to the stormy mind !
 “ To me more pleasing than the valley’s rest ;
 “ For in despair alone, the wretched find
 “ That unction sweet which lull the bleeding
 “ breast !” *

Brief let me be ; the fatal storm arose,
 The billows raged, the pilot’s art was vain ;
 From the tall rock, which circling surges clove,
 Headlong she leapt, and ended all her pain.

SECT. XXV.

RESTRAINT.

To the happiness of our first years, nothing more seems necessary than freedom from restraint. Every man must remember, that when he was left to himself, and indulged in the disposal of his own actions, he was content, without the addition of any other enjoyment than freedom. Liberated from the shackles of discipline, he looks abroad into the world with rapture, he sees an Elysian region open before him, so variegated with beauty, and filled with good, that his heart overflows with delight. But the clock strikes, the school hour is come: what an alteration! In a moment his eyes lose their fire, his cheerfulness is at an end: farewell to joy and play. A severe and crabbed master takes him by the hand, and saying, gravely and sharply, *Come, sir*, forces him away. The chamber he is led into is furnished with books, and the poor lad suffers himself to be dragged thither, casting in silence an eye of regret on every object around him, the orbits twimming in tears he dare not shed, and his heart swelling with sighs he dare not vent. We will suppose two of these scholars broke loose from school. They will, I am positive, do more mischief in a country village than all the boys of the parish.

Shot up one of these young gentleman with the son of a peasant of the same age ; and the first will have broken, or turned all the moveables in the room topsy turvy, before the latter has even stirred from his chair. *

It is observed by Sir William Hamilton, in his account of an irruption of Mount Vesuvius, that the boys and the nuns seemed to be the only persons who felt *happy* among the sufferers from this dreadful calamity. The prancing of a horse, when first turned out into a field, depends upon the same general principle.

S E C T. XXVI.

CAPTIVITY.

Soon after the execution of the tyrant Robespierre, the committee of general safety appointed a deputation of its members to visit the prisons, and speak the words of comfort to the prisoners. In the mean time orders for liberty arrived in glad succession ; and the prisons of Paris, so lately the abodes of hopeless misery, now exhibited scenes which an angel might have contemplated with ecstasy. Upon the fall of the republican tyrant, the terrible spell which bound the land of France was broken ; the shrieking whirlwinds, the black precipices, the bottomless gulphs, suddenly vanished. The generous affections, the tender sympathies, so long repressed by the congealing stupefaction of terror, burst forth with uncontrollable energy ; and the enthusiasm of humanity took place of the gloomy terror of despair, as suddenly as when the winter's ice dissolves in the clear sunshine, or that luminary assumes its effulgence after an eclipse.

The first persons released from the Luxembourg were Monsieur and Madame Bitauby, two days after the fall of Robespierre. When they were liberated, the prisoners, to the amount of nine hundred persons, formed a lane to see them pass ; they embraced

embraced them, they bathed them with tears, they overwhelmed them with benedictions, they hailed with transport the moment which gave themselves the earnest of returning freedom: but the feelings of *such moments* may be imagined, but cannot be described. Crowds of people were constantly assembled at the gates of the prisons, to enjoy the luxury of seeing the prisoners snatched from their living tombs and restored to freedom: that very people, who, when they first shook off their yoke of regal dominion, had committed every excess, and afterwards beheld, with stupid silence, the daily work of death under new rulers, now melted into tears over the sufferers, and filled the air with the loudest acclamations at their release. Paris was converted into a scene of enthusiastic transport. The theatres, the public walks, the streets, resounded with the songs of rejoicing; the people indulged themselves in all the frolic gaiety which belongs especially to their character; whilst the transport of the prisoners choked the voice of utterance.

SECT. XXVII.

ANTYTHESIS.

IMAGINE to yourself Demosthenes addressing the most illustrious assembly in the world, upon a point whereon the fate of the most illustrious of nations depend. How awful such a meeting! How vast the subject! Is any man possessed of talents adequate to the great occasion? Adequate—yes, superior. “I beheld Philip,” says Demosthenes, “he with whom was your contest, resolutely, while in pursuit of empire and dominion, exposing himself to every wound; his eye gored, his neck wrested, his arm, his thigh pierced; whatever part of his body fortune should seize on, that cheerfully relinquishing; provided that, with what remained, he might live with honour and renown.—And shall it be said, that *he*, born in Pella, a place heretofore mean and ignoble, should be inspired with so high an ambition and thirst of fame, while *you*, Athenians!!” &c. Thus Demosthenes, by the organs of his body, attuned to the exertions of his mind, through the kindred organs of the hearers, instantaneously, and, as it were, with an electrical spirit, vibrates those energies from soul to soul.—Notwithstanding the diversity of minds in such a multitude, by the lightning of eloquence, they are melted into one mass—The whole assembly, actuated in one and the same

same way, become, as it were, one man, and have but one voice.—The universal cry is—"Let us march against Philip—let us fight for our liberties"—let us conquer or die!"

Hannibal having assembled together all his forces, previous to the battle of Ticinus, he brought before them the young prisoners whom he had taken among those barbarians that had disturbed his march across the Alps. With a view to the design which he now put in practice, he had before given orders, that these men should be treated with the last severity. They were loaded with heavy chains; their bodies were emaciated with hunger; and mangled by blows and stripes. In this condition, he now placed them in the midst of the assembly; and threw before them some suits of Gallic armour, such as their kings are accustomed to wear when they engage in single combat. He ordered some horses also to be set before them; and military habits, that were very rich and splendid. He then demanded of the young men, "which of them were willing to try their fate in arms against each other; on condition that the conqueror should possess those spoils that were before their eyes, while the vanquished would be released by death from all his miseries." The captives, with one voice, cried out, and testified the utmost eagerness to engage. Hannibal then commanded, "that lots should be cast among them; and that those two, upon whom the lot should fall, should take the arms that were before them, and begin the combat."

When

When the prisoners heard these orders, they extended their hands towards the heavens; and every one most fervently implored the gods that the lot to fight might be his own. And no sooner was their chance decided, than those whose fortune it was to engage, appeared filled with joy, while the rest were mournful and dejected. When the combat was also determined, the captives, that were by lot excluded the trial, pronounced "him who had lost
 " his life in the engagement to be, in their fight,
 " not less happy than the conqueror: since by dy-
 " ing, he was released from all that wretchedness,
 " which they were still doomed to suffer." The same reflections arose also in the minds of the Carthaginian soldiers; who, from comparing the condition of the dead with the ill fate of those that were led back again to chains and torture, declared "the
 " former to be happy," and gave "their pity" to the sufferings of the latter.

When Hannibal perceived that this contrivance had produced in the minds of all the army the effect that was intended from it, he came among the soldiers, and then addressed them as follows: "I have
 " offered this spectacle to your view, that, when
 " you have discerned your own condition in the fate
 " of those unhappy captives, you might more clearly judge what resolutions were most proper to be
 " taken, and in what manner you might best form
 " your conduct in the present circumstances. For,
 " in the combat which you have seen, and the
 " prize

“ prize proposed to the conqueror, is displayed a
 “ perfect image of that state into which you your-
 “ selves are now brought by fortune. Such indeed
 “ is your situation, that you must either conquer,—
 “ or be slain in battle,—or else fall alive into the
 “ power of your enemies. By *conquest*, you will
 “ obtain a prize not of horses and military habits,
 “ but the whole wealth and riches of the Roman
 “ empire; and will then become the happiest of
 “ mankind: and if you were to fall in battle, you
 “ will then only die; without being first exposed to
 “ any kind of misery; and contending, to your
 “ latest breath, for the most glorious of all victories.
 “ But, *on the other hand*, in case you are conquered,
 “ and the love of life should flatter you with the
 “ hopes of being able to escape by flight, or you
 “ should even consent upon any terms to live after
 “ your defeat; it is manifest, beyond all doubt, that
 “ nothing but the extremity of wretchedness can
 “ await you: for surely there is none among you,
 “ who, when you have considered how vast a
 “ length of country you have traversed, what ene-
 “ mies have opposed you in their way, and what
 “ large and rapid rivers you were forced to pass,
 “ could be so wholly destitute of all sense and judg-
 “ ment as ever to be persuaded, that it was possi-
 “ ble to regain your several countries. I conjure
 “ you, therefore, to lay aside all such hopes; and,
 “ in judging of your own state and fortune, to re-
 “ tain those sentiments, which you have just now

“ shewn with regard to the condition of the cap-
 “ tives. As in that case, you declared both the
 “ man that conquered, and him who fell in the
 “ combat, *to be happy*, and *pitied* those who were
 “ reserved alive ; so your business now is, to con-
 “ quer, if it be possible ; and if not to die ; and on
 “ no account to entertain even the smallest expec-
 “ tation or thought of life, in case you are conquer-
 “ ed. And if you will heartily embrace these sen-
 “ timents, and carry this resolution with you into
 “ action, there is indeed no room to doubt, but
 “ that you must both live and conquer. For no
 “ troops were ever known to be defeated, who had
 “ once been fixed in this determination, either by
 “ necessity or choice. But that, *in the other hand*,
 “ an army which, like the Romans, see their coun-
 “ try open to them on every side, and ready to
 “ receive all those that can escape by flight, must
 “ necessarily fall beneath the efforts of men, whose
 “ only hopes are placed in victory.”

When *we* feel ourselves hurried off by any ur-
 common effect, let us try to investigate the *cause*,
 and ask ourselves why we are thus delighted, thus
 affected ? Effects indeed strike us, when we are not
 thinking about the *cause* ; yet may we be assured,
 if we reflect, that a *cause* there is ; and that too a
cause intelligent and rational. In that part of the
 Philippic of Demosthenes it is the *antibesis* that
 heightens the description ; which is still more *forcibly*
 exhibited in the spectacle contrived by the Car-
 rhaginian general, and in his harangue.

S E C T. XXVIII.

THE SAME SUBJECT CONTINUED.

ON the *antitbesis* often depends much of the beauty and clearness of history. We will take an example from Tacitus.

The night in *both camps* was busy and unquiet.

The *barbarians* passed their time in jollity and carousing; warlike songs and savage howlings kept a constant uproar, while the woods and vallies rung with the hideous sound.

In the *Roman* camp the scene was different: pale gleaming fires were seen; no sound, save that of low and hollow murmurs; the soldiers lay extended at length under the palisades, or wandered from tent to tent, fatigued and weary, yet scarce awake. Cæcina was disturbed by a terrible dream: he thought he saw Quintillus Varus, who had been slaughtered with his whole army, emerging from the fens.

Arminius, at break of day, observing the baggage of the Roman army in their march stuck fast in a morass; the soldiers gathering round in tumult and disorder; the eagles in confusion; he ordered his men to make a vigorous attack; and by gnawing and mangling the horses, made a dreadful havoc.

Goaded

Goaded by wounds, and not able to keep their legs on a slimy soil, which was made still more slippery by the effusion of their own blood, those animals in their fury overturned all in their way, and trampled under feet the wretches that lay on the ground. The chief distress was round the eagles; to support them under a heavy volley of darts was difficult, and to fix them in swampy ground impossible. Cæcina, exerting himself with undaunted vigour to sustain the ranks, had his horse killed under him. The barbarians were ready to surround him, if the first legion had not come up to his assistance.

At length the rage for plunder, natural to savages, turned the fortune of the day. Intent on booty, the *Germans* desisted from the fight.

The *Romans* seized this opportunity, and, towards the close of the day, they gained a station on solid ground. Their distress, however, was not at an end: entrenchments were to be raised; earth to be brought; their tools for digging and cutting the soil were lost; no tents for the soldiers; no medicine for the wounded; their provisions in a vile condition, deformed with filth and blood; a night big with horror hung over their heads; and the ensuing day, to a number of brave and gallant men, might prove the last.

Cæcina seeing this abased spirit of the legions addressed them from the part of the camp assigned for the eagles. Having commanded silence, he ex-

planned their situation, and the necessity that called upon them to act like men. “ They had nothing
 “ to depend upon except their valour; but their
 “ valour must be cool, deliberate, guided by prudence. Let all remain within the lines, till the
 “ barbarians, in hopes of carrying the works, should
 “ advance to the assault. Then will be the time
 “ to shew themselves. If they fled, other woods,
 “ and deeper fens, remained behind; perhaps more
 “ savage enemies. By one glorious victory they
 “ were sure of gaining every advantage; honoured
 “ by their country, loved by their families, and applauded by the whole army.”

The *Germans*, in the mean time, were no less in agitation; their hopes of conquest, the love of plunder, and the jarring counsels of the chiefs, distracted every mind.

Arminius proposed “ to let the Romans break
 “ up their camp, and surround them again in the
 “ narrow defiles, and in the bogs and marshes.” Inguimer, more fierce and violent, and for that reason more acceptable to the genius of barbarians,
 “ was for storming the camp: it would be carried
 “ by a general assault; the number of prisoners
 “ would be great, and the booty more entire.” His advice prevailed.

At the point of day the march began: at the first onset the Germans levelled the fossé, threw heaps of hurdles, and attempted a scalade.

The ramparts were thinly manned; and the *soldiers*,

chers, who appeared to defend them, as if panic struck, fled.

The *barbarians* soon clambered over the works to pursue the flying enemy.

In that moment the signal was given to the cohorts; clarions and trumpets sounded through the camp; the *Romans* in a body, and with a general shout, rushed on to the attack. They furiously fell upon the enemy, crying aloud, as they advanced, "Here are no woods, no treacherous fens; we are here on equal ground."

The *barbarians* had promised themselves an easy conquest. The affair they imagined would be with a handful of men; but their surprise rose *in proportion*, when they heard the clangour of trumpets, and saw the field glittering with opposing arms. The sudden terror *magnified* their danger. A dreadful slaughter immediately ensued. The two chiefs betook themselves to flight; Arminius unhurt, and Inguimer dangerously wounded.

No quarter was given. The pursuit continued as long as day-light, and resentment lasted. Night coming on, the *legions* returned to their camp, covered with new wounds, and their provisions no better than the day before: but health, and food, and vigour, all things were found in *victory*.

SECT. XXIX.

AN AWFUL PAUSE.

THE island of Lesbos, extending above an hundred and fifty miles in circumference, is the largest, except Eubœa, in the Ægean sea. Originally planted by Eolians, Lesbos was the mother of many Eolic colonies. They were established on the opposite continent, and separated from their metropolis by a strait of seven miles, which expands itself into the gulf of Thebe, and is beautifully diversified by the Hecatonnesian and Arginussian isles, of old sacred to Apollo. The happy temperature of the climate of Lesbos conspired with the rich fertility of the soil to produce those delicious fruits, and those exquisite wines, which are still acknowledged by modern travellers to deserve the encomiums so liberally bestowed on them by ancient writers*. The conveniencies of its harbours furnished another source of wealth and advantage to this delightful island, which, as early as the age of Homer, was reckoned populous and powerful, and, like the rest of Greece, at that time,

* Mont. de Guys, Tournefort, &c. agree with Horace (saturn) and Strabo, l. xiii. p. 584—657, from which the following particulars, in the text, concerning Lesbos, are extracted.

governed

governed by the moderate jurisdiction of hereditary princes. The abuse of royal power occasioned the dissolution of monarchy in Lesbos, as well as in the neighbouring isles. The rival cities of Mitylené and Methymna contended for republican pre-eminence. The former prevailed; and having reduced Methymna, as well as six cities of inferior note, began to extend its dominion beyond the narrow bounds of the island, and conquered a considerable part of Troas. Meanwhile the internal government of Mitylené was often disturbed by sedition, and sometimes usurped by tyrants. The wise Pittacus, contemporary and rival of Solon, endeavoured to remedy these evils by giving his countrymen a body of laws, comprised in six hundred verses, which adjusted their political rights, and regulated their behaviour and manners. The Lesbians afterwards underwent those general revolutions, to which both the islands and the continent of Asia Minor were exposed from the Lydian and Persian power. Delivered from the yoke of Persia by the successful valour of Athens and Sparta, the Lesbians, as well as the Greek settlements around them, spurned the tyrannical authority of Sparta and Pausanias, and ranged themselves under the honourable colours of Athens, which they thenceforth continued to respect in peace, and to follow in war.

But even the apparent freedom which the Lesbians enjoyed had now become extremely precarious.

They felt themselves under the disagreeable necessity to soothe, to bribe, and to flatter the Athenian demagogues, and in all their transactions with that imperious people, to testify the most mortifying deference and most abject submission. Notwithstanding their watchful attention never designedly to offend, they were continually endangered by the quarrelsome humour of a capricious multitude, and had reason to dread, lest, in consequence of some unexpected gust of passion, they should be compelled to demolish their walls, and to surrender their shipping, the punishments already inflicted on such of the neighbouring islands as had incurred the displeasure of Athens.

This uneasy situation naturally disposed the Lesbians, amidst the calamities of the second Peloponnesian invasion, heightened by the plague at Athens, to watch an opportunity to revolt. The following year was employed in assembling the scattered inhabitants of the island within the walls of Mitylené, in strengthening these walls, in fortifying their harbours, in augmenting their fleet, and in collecting troops and provisions from that fertile shores of the Euxine sea. But in the fourth year of the war, their design, yet unripe for execution, was made known to the Athenians by the inhabitants of Tenedos, the neighbours and enemies of Lesbos, as well as by the citizens of Methymna, the ancient rival of Mitylené, and by several malcontents in the Lesbian capital. Notwithstanding the

the concurrence of such powerful testimonies, the Athenian magistrates affected to disbelieve intelligence which their distressed circumstances rendered peculiarly alarming. The Lesbians, it was said, could never think of forsaking the alliance of a country which had always treated them with such distinguished favour, how powerfully soever they might be urged to that measure by the Thebans, their Eolian brethren, and the Spartans, their ancient confederates. Ambassadors, however, were sent to Lesbos, desiring an explanation of rumours so dishonourable to the fidelity and gratitude of the island.

The ambassadors having confirmed the report, Athens equipped a fleet of forty sail, intending to attack the enemy by surprise; while they celebrated with universal consent the anniversary festival of Apollo, on the promontory of Malea. But this design was rendered abortive by the diligence of a Mitylenian traveller, who, passing from Athens to Eubœa, proceeded southward to Geraiastos, and, embarking in a merchant vessel, reached Lesbos in less than three days from the time that he undertook this important service. His seasonable advice not only prevented the Mitylenians from leaving their city, but prepared them to appear, at the arrival of the enemy, in a tolerable posture of defence. This state of preparation enabled them to obtain from Cleippidas, the Athenian admiral, a suspension of hostilities, until they dispatched an

embassy to Athens, to remove, as they pretended, the groundless resentment of the people, and to give ample satisfaction to the magistrates.

On the part of the Lesbians, this transaction was nothing more than a contrivance to gain time. They expected no favour or forgiveness from the Athenian assembly; and while this illusive negotiation was carrying on at Athens, other ambassadors went secretly to Sparta, requesting that the Lesbians might be admitted into the Peloponnesian confederacy, and thus entitled to the protection of that powerful league. The Spartans referred them to the general assembly, which was to be soon held at Olympia, to solemnize the most splendid of all the Grecian festivals. After the games were ended, and the Athenians, who little expected that such matters were in agitation, had returned home, the Lesbian ambassadors were favourably heard in a general convention of the Peloponnesian representatives or deputies, from whom they received assurance of immediate and effectual assistance.

This promise, however, was not punctually performed. The eyes of the Athenians were at length opened; and while the Peloponnesians prepared or deliberated, their more active enemies had already taken the field. Various skirmishes, in which the islanders shewed little vigour in their own defence, engaged the neighbouring states of Lemnos and Imbros to send, on the first summons, considerable supplies of troops to their Athenian confederates; but

but as the combined forces were still insufficient completely to invest Mitylené, a powerful reinforcement was sent from Athens; and before the beginning of winter, the place was locked up by land, while an Athenian fleet occupied the harbour.

Despair of assistance, and scarcity of provisions, had obliged Salæthus, General of the besieged, who began himself by this time to suspect that the Peloponnesians had laid aside all thoughts of succouring the place, to arm the populace, in order to make a vigorous assault on the Athenian lines. But the lower ranks of men, who in Lesbos, as well as in the Grecian isles, naturally favoured the cause of Athens, the avowed patron of democracy, no sooner received their armour than they refused obeying their superiors, and threatened, that unless the corn were speedily brought to the market-place, and equally divided among all the citizens, they would instantly submit to the besiegers. The aristocratical party prudently yielded to the torrent of popular fury, which they had not strength to resist; and justly apprehensive, lest a more obstinate defence might totally exclude them from the benefit of capitulation, they surrendered to Paches, the Athenian commander, on condition that none of the prisoners should be enslaved or put to death, until their agents, who were immediately sent to implore the clemency of Athens, should return with the sentence of that republic.

Immediately after the arrival of the Mitylenian ambassadors,

ambassadors, the people of Athens had assembled to deliberate on this important subject. Agitated by the giddy transports of triumph over the rebellious ingratitude and perfidy of a people, who, though distinguished by peculiar favours, had abandoned and betrayed their protectors in the season of danger, the Athenians doomed to death all the Mitylenian citizens, and condemned the women and children to perpetual servitude. In one day the bill was proposed, the decree passed, and the same evening a galley was dispatched to Paches, conveying this cruel and bloody resolution. But the night left room for reflection; and the feelings of humanity were awakened by the stings of remorse. In the morning, having assembled, as usual, in the public square, men were surprised and pleased to find the sentiments of their neighbours exactly corresponding with their own. Their dejected countenances met each other; they lamented, with one accord, the rashness and ferocity of their passion, and bewailed the unhappy fate of Mitylené, the destined object of their misguided frenzy. The Mitylenian ambassadors availed themselves of this sudden change of sentiment; a new assembly was convened, and the question submitted to a second deliberation, when the decree was reversed.

It however remained uncertain, whether this late and reluctant repentance would avail the Mitylenians, who, before any advice of it arrived, might
be

be condemned and executed in consequence of the former decree.

A galley was instantly furnished with every thing that might promote expedition. The Mitylenian deputies promised invaluable rewards to the rowers. But the fate of a numerous, and lately flourishing community, still depended on the uncertainty of winds and currents. The first advice-boat had failed, as the messenger of bad news, with a slow and melancholy progress. The second advanced with the rapid movement of joy. Not an adverse blast opposed her course. The necessity of food and sleep never restrained a moment the labour of the oar: and her diligence was rewarded by reaching Lesbos in time to check the cruel hand of the executioner.

The people had been assembled, the bloody sentence had been just read, even the orders had been issued for its execution, when the critical arrival of the Athenian galley converted the lamentable outcries, and gloomy despair of a whole republic, into the most *extravagant expressions* of admiration and of gratitude: having before given up their lives and fortunes as lost, they *now* abandoned themselves to the excess of joy, and the whole city exhibited the most frantic scenes of exultation *.

* Gillies.

SECT. XXX.

OPPOSITION OF LIGHT AND SHADE

Let their lights, and Gods, and fill with light
 Ethereal first of things, quittedness put,
 Sprung from the deep, and from his native cave
 To journey through the airy gloom began,
 Spheer'd in radiant cloud, for yet the sun
 Was not—God saw the light was good,
 And light from darkness by the Lenny here
 Divided, light the day and darkness night
 He nam'd—Thus was the first day even and morn,
 Not instantane but did not unfurrow
 By the celestial quines, when erent night
 Exhaling first from darkness they beheld,
 ————— with joy and shout,
 The hollow universal orb they fill'd,
 And touch'd their golden hump and by rising found
 God and his words—CAVOR him thy song
 Both when first evening was, and when last morn

MILTON

PAINTERS, says Plutarch, increase the effect of
 the light and splendid parts of a picture by the
 neighbourhood of dark tints and shades, and
 Maximus Tyrius observes, that bright and vivid
 colours are always pleasant to the eye, but this
 pleasure is considerably heightened if you accom-
 pany them with tints somewhat dark and gloomy.
 These passages of the ancients seem to imply an
 acquaintance

acquaintance with the use of cold and dark tints, where a brilliancy of tone in other parts is required, although the discovery of the *claro-obscuro* is chiefly attributed to the moderns. One of the main excellencies of Raphael is his fondness for great masses of light, and deep shadows, which he observes equally in the naked as in the attired figure. The painters of the Venetian school more especially endeavoured by the opposition of coloured objects, and by the contrast of light and shade, to produce a vigorous effect, which demands and fixes the attention. This is more particularly the characteristic of the Dutch school. By their knowledge of contrast, they arrived at the difficult art of painting even light itself. Rembrant more especially delighted in the great opposition of light and shade. The room where he used to paint was darkened, and he received the light only by a small aperture in the shutter, which he contrived so as to fall and illumine the object he was designing. Hence Rembrant's manner of painting appears like magic. None exceeded him in the knowledge he had of the effects of different colours mingled together, nor could better distinguish those which did not agree with those which did. He placed every tone in its place with so much exactness and taste, that he needed not to mix his opposing colours, and so destroy what may be called the flower and freshness of them. He often loaded his lights with so great a quantity of colour (to make the brightest reflection), that

that in some instances he may be said to model and not to paint. In his famous picture representing the *Virgin* at the foot of the cross on Mount Calvary, the principal light darts upon her through a break of the clouds, while all the other figures stand obscured by shade. In the resurrection of *Lazarus* there is introduced a long stream of light on the principal objects. It is by this means that his compositions appear so strikingly divided into different groups. Tintoret, too, acquired great reputation, as well as briskness, with which he enlivened his figures, by his masterly manner of placing his lights and shadows. Tintoret, as well as Poussin, modelled their figures, and used to illumine them by a bright lamp or candle light, by which means they were able greatly to heighten their lights and shadows. Among painters of our day none have carried this opposition to higher perfection than Mr. Ruffel, in his picture of Cupid presenting the night-blowing Cereus to Hymen *. The torch and altar of Hymen reflect warm light on the figures, whilst the back-ground scenery has the cold and blue light of the moon partly obscured by clouds. This is also very finely exhibited in some sublime paintings by Pether. He has represented an irruption of Mount Vesuvius during a full moon, each mingling their different lights upon the heaven

* This picture was painted for Dr. THORNTON'S *New Illustration of the Sexual System of LINNÆUS*, and was in the Exhibition.

and on the waters. In another picture we have a village on fire with a moon-light scenery; and in a third, a moon-light with the warm emanation from a forge of a blacksmith's shop. That these paintings owe much of their effect from the principle we are endeavouring to prove by a variety of arguments, we think no one can deny, and the principle itself is generally known and allowed by painters themselves.

S E C T. XXXI.

DESCRIPTION OF A GROTTTO.

ANTIPAROS is an island in the Archipelago. This island is remarkable for a subterraneous cavern or grotto, accounted one of the greatest natural curiosities in the world. It was first discovered in the last century by one Magni an Italian traveller, who has given us the following account: "Having been informed," says he, "by the natives of Paros, that in the little island of Antiparos, which lies about two miles from the former, of a gigantic statue that was to be seen at the mouth of a cavern in that place, it was resolved that we (the French consul and myself) should pay it a visit. In pursuance of this resolution, after we had landed on the island, and walked about four miles through the midst of beautiful plains and sloping woodlands, we at length came to a little hill, on the side of which yawned a most horrid cavern, that with its gloom at first struck us with terror, and almost repressed curiosity. Recovering the first surprise, however, we entered boldly; and had not proceeded above 20 paces, when the supposed statue of the giant presented itself to our view. We quickly perceived, that what the ignorant natives had been terrified at as a giant,

was

was nothing more than a sparry concretion, formed by the water dropping from the roof of the cave, and by degrees hardening into a figure that their fears had formed into a monster. Incited by this extraordinary appearance, we were induced to proceed still farther, in quest of new adventures in this horrible subterranean cave. As we proceeded, new wonders offered themselves, until we arrived at the most magnificent part of the cavern.

Our flambeaus being all lighted up, and the whole place completely illuminated, never could the eye be presented with a more glittering or a more magnificent scene. The roof all hung with solid icicles, transparent as glass, yet solid as marble. The eye could scarce reach the lofty and noble ceiling; the sides were regularly formed with spars; and the whole presented the idea of a magnificent theatre, illuminated with an immense profusion of lights. The floor consisted of solid marble; and in several places, magnificent columns, thrones, altars, and other objects, appeared, as if nature had designed to mock the curiosities of art. Our voices, upon speaking or singing, were redoubled to an astonishing loudness; and, upon the firing of a gun, the noise and reverberations were almost deafening. In the midst of this grand amphitheatre rose a concretion of about 15 feet high, that, in some measure, resembled an altar; from which, taking the hint, we caused mass to be celebrated there. The beautiful columns that shot up round

the altar, appeared like candlesticks; and many other natural objects represented the customary ornaments of this sacrament.

A more particular account of this famous grotto has been published by one Charles Saunders; which, as it is very interesting, and seems to bear sufficient marks of authenticity, we shall here insert. " Its entrance (speaking of this subterranean wonder) lies in the side of a rock, about two miles from the sea-shore; and is a spacious and very large arch, formed of rough craggy rocks, overhung with brambles and a great many climbing plants, that give it a gloominess which is very awful and agreeable. Our surgeon, myself, and four passengers, attended by six guides with lighted torches, entered this cavern about eight o'clock in the morning, in the middle of August last. We had not gone 20 yards in this cavity when we lost all sight of day-light: but our guides going before us with lights, we entered into a low narrow kind of alley, surrounded every way with stones all glittering like diamonds by the light of our torches; the whole being covered and lined throughout with small crystals, which gave a thousand various colours by their different reflections. This alley grows lower and narrower as one goes on, till at length one can scarce get along it. At the end of this passage we were each of us presented with a rope to tie about our middles; which when we had done, our guides led us to the brink of a most horrible precipice.

The

The descent into this ~~was~~ very steep, and the place all dark and gloomy. We could see nothing, in short, but some of our guides with torches in a miserable dark place, at a vast distance below us. The dreadful depth of this place, and the horror of the descent through a miserable darkness into it, made me look back to the lane of diamonds, if I may so call it, through which we had just passed; and I could not but think I was leaving heaven, to descend into the infernal regions. The hope of something fine at my journey's end, tempted me, however, to trust myself to the rope, and my guides at the top, to let myself down. After about two minutes dangling in this posture, not without much pain as well as terror, I found myself safe, however, at the bottom; and our friends all soon followed the example. When we had congratulated here with one another on our safe descent, I was inquiring where the grotto, as they called it, was. Our guides, shaking their heads, told us, we had a great way to that yet; and led us forward about 30 yards under a roof of ragged rocks, in a scene of terrible darkness, and at a vast depth from the surface of the earth, to the brink of another precipice much deeper and more terrible than the former. Two of the guides went down here with their torches first; and by their light we could see, that this passage was not so perpendicular indeed as the other, but lay in a very steep slant, with a very slippery rock for the bottom; vast pieces of rough rugged rocks jut-

ting out in many places on the right hand, in the descent, and forcing the guides sometimes to climb over, sometimes to creep under them, and sometimes to round them; and on the left, a thousand dark caverns, like so many monstrous wells, ready, if a foot should slip, to swallow them up for ever. We stood on the edge to see these people with their lights descend before us; and were amazed and terrified to see them continue descending till they seemed at a monstrous and most frightful depth. When they were at the bottom, however, they halloed to us; and we, trembling and quaking, began to descend after them. We had not gone 30 feet down, when we came to a place where the rock was perfectly perpendicular; and a vast cavern seemed to open its mouth to swallow us up on one side, while a wall of rugged rock threatened to tear us to pieces on the other. I was quite disheartened at this terrible prospect, and declared I would go back: but our guides assured us there was no danger; and the rest of the company resolving to see the bottom, now they were come so far, I would not leave them: so on we went to a corner where there was placed an old slippery and rotten ladder, which hung down close to the rock; and down this, one after another, we at length all descended. When we had got to the bottom of this we found ourselves at the entrance of another passage, which was terrible enough indeed; but in this there was not wanting something of beauty. This was a wide and gradual

gradual descent; at the entrance of which one of our guides seated himself on his breech, and began to slide down, telling us we must do the same. We could discover, by the light of his torch, that this passage was one of the noblest vaults in the world. It is about nine feet high, seven wide, and has for its bottom a fine green glossy marble. The walls and arch of the roof of this being as smooth and even in most places as if wrought by art, and made of a fine glistening red and white granite, supported here and there with columns of a deep blood-red shining porphyry, made, with the reflection of the lights, an appearance not to be conceived. This passage is at least 40 yards long; and of so steep a descent, that one has enough to do, when seated on one's breech, not to descend too quickly. Our guides, that we kept with us, could here keep on each side of us: and, what with the prodigious grandeur and beauty of the place, our easy travelling through it, and the diversion of our now and then running after one another whether we would or not; this was much the pleasantest part of our journey. When we had entered this passage, I imagined we should at the bottom join the two guides we had first set down: but alas! when we were got there, we found ourselves only at the mouth of another precipice, down which we descended by a second ladder not much better than the former. I could have admired this place also, would my terror have suffered me; but the dread of falling, kept

all my thoughts employed during my descent. I could not but observe, however, as my companions were coming down after me, that the wall, if I may so call it, which the ladder hung by, was one mass of blood-red marble, covered with white spangs of rock-crystal as long as my finger, and making, with the glow of the purple from behind, one continued immense sheet of amethysts. From the foot of this ladder we slid on our bellies through another shallow vault of polished green and white marble, about 20 feet, and at the bottom of this joined our guides. Here we all got together once again, and drank some rum, to give us courage before we proceeded any farther. After this short refreshment, we proceeded by a strait, but somewhat slanting passage, of a rough, hard, and somewhat coarse stone, full of a thousand strange figures of snakes rolled round, and looking as if alive; but in reality as cold and hard as the rest of the stone, and nothing but some of the stone itself in that shape. We walked pretty easily along this descent for near 200 yards, where we saw two pillars seemingly made to support the roof from falling in. but in reality it was no such thing, for they were very brittle, and made of a fine glittering yellow marble. When we had passed these about 200 yards, we found ourselves at the brink of another very terrible precipice: but this our guides assured us was the last, and there being a very good ladder to go down by, we readily ventured. At the bottom of this steep wall,

wall, as I may call it, we found ourselves for some way upon plain even ground; but, after about 40 yards walking, were presented by our guides with ropes again; which we fastened about our middles, though not to be swung down by, but only for fear of danger, as there are lakes and deep waters all the way from hence on the left hand. With this caution, however, we entered the last alley: and horrible work it was indeed to get through it. All was perfectly horrid and dismal here. The sides and roof of the passage were all of black stone; and the rocks in our way were in some places so steep, that we were forced to lie all along on our backs, and slide down; and so rough, that they cut our clothes, and bruised us miserably in passing. Over our heads, there were nothing but ragged black rocks, some of them looking as if they were every moment ready to fall in upon us; and, on our left hands, the light of our guides torches showed us continually the surfaces of dirty and miserably looking lakes of water. If I had heartily repented of my expedition often before, here I assure you I was all in a cold sweat, and fairly gave myself over for lost; heartily cursing all the travellers that had written of this place, that they had described it so as to tempt people to see it, and never told us of the horrors that lay in the way. In the midst of all these reflections, and in the very dismallest part of all the cavern, on a sudden we had lost four of our six guides. What was my terror on this sight! The

place was a thousand times darker and more terrible for want of their torches; and I expected no other but every moment to follow them into some of these lakes, into which I doubted not but they were fallen. The remaining two guides said all they could, indeed, to cheer us up; and told us we should see the other four again soon, and that we were near the end of our journey. I do not know what effect this might have upon the rest of my companions; but I assure you I believed no part of the speech but the last, which I expected every moment to find fulfilled in some pond or precipice. Our passage was by this time become very narrow, and we were obliged to crawl on all-fours over rugged rocks; ~~when~~ in an instant, and in the midst of these melancholy apprehensions, I heard a little hissing noise, and saw myself in utter, and not to be described, darkness. Our guides called indeed cheerfully to us, and told us that they had accidentally dropped their torches into a puddle of water, but we should soon come to the rest of them, and they would light them again; and told us there was no danger, and we had nothing to do but to crawl forward. I cannot say but I was amazed at the courage of these people; who were in a place where, I thought, four of them had already perished, and from whence we could none of us ever escape; and determined to lie down and die where I was. Words cannot describe the horror, or the extreme darkness of the place. One of our guides, however,

perceiving

perceiving that I did not advance, came up to me, and clapping his hand firmly over my eyes, dragged me a few paces forward. While I was in this strange condition, expecting every moment death in a thousand shapes, and trembling to think what the guide meant by this rough proceeding, he lifted me at once over a great stone, set me down on my feet, and took his hand from before my eyes. *What words can describe at that instant my astonishment and transport! Instead of darkness and despair, all was splendor and magnificence before me; our guides all appeared about us; the place was illuminated by 50 torches, and the guides all welcomed me into the grotto of Antiparos.* The four that were first missing, I now found had only given us the slip, to get the torches lighted up before we came; and the other two had put out their lights on purpose, to make us enter out of *utter darkness* into this pavilion of *splendor and glory*. I am now come to the proper part of this section; which was, to describe this grotto. But I must confess to you that words cannot do it. The amazing beauties of the place, the eye that sees them only can conceive.

The people told us, the depth of this place was 485 yards; the grotto, in which we now were, is a cavern of 120 yards wide, and 113 long, and seems about 60 yards high in most places. These measures differ something from the accounts travellers in general give us; but you may depend upon them as exact, for I took them with my own hand. Imagine

gine then with yourself, an immense arch like this, almost all over lined with fine and bright crystal-lised white marble, and *illuminated with 50 torches*; and you will then have some faint idea of the place I had the pleasure to spend three hours in. This, however, is but a faint description of its beauties. The roof, which is a fine vaulted arch, is hung all over with icicles of white shining marble, some of them ten feet long, and as thick as one's middle at the root; and among these there hang 1000 festoons of leaves and flowers, of the same substance; but so very glittering, that there is no bearing to look up at them. The sides of the arch are planted with seeming trees of the same white marble, rising in rows one above another, and often enclosing the points of the icicles. From these trees there are also hung festoons, tied as it were from one to another in vast quantities; and in some places among them there seem rivers of marble winding through them in a thousand meanders. All these things are only made, in a long course of years, from the dropping of water, but really look like trees and brooks turned to marble. The floor we trod upon was rough and uneven, with crystals of all colours growing irregularly out of it, red, blue, green, and some of a pale yellow. These were all shaped like pieces of saltpetre; but so hard, that they cut our shoes: among these, here and there, are placed icicles of the same white shining marble with those above, and seeming to have

have fallen down from the roof and fixed there; only the big end of these is to the floor. To all these our guides had tied torches, two or three to a pillar, and kept continually beating them to make them burn bright. You may guess what a glare of splendor and beauty must be the effect of this illumination, among such rocks and columns of marble. All round the lower part of the sides of the arch are a thousand white masses of marble, in the shape of oak-trees. In short, they are large enough to enclose, in many places, a piece of ground big enough for a bed-chamber. One of these chambers has a fair white curtain, whiter than satin, of the same marble, stretched all over the front of it. In this we all cut our names, and the date of the year, as a great many people have done before us."

S E C-T. XXXII.

OPPOSITION OF CHARACTER.

OPPOSITION of character is the soul of historical painting, of poetry, and of the drama. From the school of Athens by Raphael we shall select one out of the many excellent groups with which it abounds, to illustrate this observation. Four boys are attending on a mathematician, who, stooping to the ground with his compasses in his hand, is giving them the demonstration of a theorem. One of the boys, recollecting within himself, keeps back, and his eyes are drawn off from his master in the profoundest revery; another, by the briskness of his attitude and immediate attention, discovers a greater *quickness of apprehension*; while a third, who has already seized the conclusion, is endeavouring to turn master, and to drive it into a fourth, who stands motionless, with a staring countenance, and has so much marked *stupidity* in his looks, as to shew he will never be able to understand any thing about it.

Poussin, in his famous picture of a sleeping Venus, has introduced a Satyr, which is intended to heighten by the effect of contrast.

S E C T. XXXIII.

D I S C O R D.

'Twas when the seas were roaring
 With hollow blasts of wind;
 A damsel lay deploring,
 All on a rock reclin'd.

Wide o'er the foaming billows
 She cast a wistful look;
 Her head was crown'd with willows
 That trembled o'er the brook.

" Twelve months are gone and over,
 " And nine long tedious days:
 " Why didst thou, vent'rous lover,
 " Why didst thou trust the seas?

" Cease, cease, thou cruel ocean,
 " And let my lover rest:
 " Ah! what's thy troubled motion
 " To that within my breast!

" The merchant, robb'd of pleasure,
 " Views tempests in despair;
 " But what's the loss of treasure
 " To losing of my dear!

" Should you some coast be laid on,
 " Where gold and di'monds grow,
 " You'd find a richer maiden,
 " But none that loves you so.

" How

- " How can they say that nature
 " Has nothing made in vain ;
 " Why then beneath the water
 " Do hideous rocks remain ?
 " No eyes these rocks discover,
 " That lurk beneath the deep,
 " To watch the wand'ring lover,
 " And leave the maid to weep."

All melancholy lying,
 Thus wail'd she for her dear ;
 Repaid each blast with sighing,
 Each billow with a tear.

When o'er the white wave flooping,
 His floating corpse she spied ;
 Then, like a lily, drooping,
 She bow'd her head, and died.

The very strong emotions that this song excites, arises not only from the sweet harmony and simplicity of the verse, and delicacy of the sentiment, but also from the art of the composer of the music in contrasting the parts: the first being in three sharps, and the following recitative in a minor key, full of the finest melody, with several contrasting notes of discord. The very powerful effect of the Allegro and Il Penseroso of Milton depends upon contrast, and some sublime passages in Handel's Messiah arise from discords, as also from some sudden bursts of harmony in the chorus, preceded by a single voice,

SECT. XXXIV.

ABSENCE FROM HOME.

THE celebrated traveller Cox observes “ one great advantage he derived from his journies, which was, that he was led by them to prefer his own to every other country.” Whether this arose from the power of reflection we will not presume to say, for every one has experienced the pleasure of returning *home*, when he has been out but a few weeks *even on a party of pleasure*.

For where to find that happiest spot below,
 Who can direct, when all pretend to know ?
 The shudd’ring tenant of the frigid zone
 Boldly proclaims that happiest spot his own ;
 Extols the treasures of his stormy seas,
 And his long nights of revelry and ease :
 The naked negro, panting at the line,
 Boasts of his golden sands and palmy wine ;
 Basks in the glare, or steers the tepid wave,
 And thanks his gods for all the good they gave.

That the passion for one’s country is increased by *absence*, is particularly manifested by the natives of Switzerland. They were so affected by a little air, expressive of their situation, that it is affirmed
 by

by several, that it once excited so exquisite a solicitude, that it was therefore prohibited to be played in France upon pain of death.

THE AIR.

Quand reverrai'je en un jour
 Tous les objets de mon amour :
 Nos claire ruisseaux
 Nos coteaux,
 Nos hameaux,
 Nos montaignes ?
 Et l'ornement des nos compaignes ?
 La si gentil le sabeau
 A l'ombre d'un ormeau,
 Quand danserai'je au son du chalumeau ?
 Quand reverrai'je en un jour,
 Tous les objets de mon amour ?
 Mon pere,
 Ma mere,
 Mon frere,
 Ma sœur,
 Mes agneaux,
 Mes troupeaux,
 Ma bergere,
 Quand reverrai'je en un jour,
 Tous les objets de mon amour.

In this air the images are all rural and simple, and in the highest degree affecting. The music is also remarkable for its simplicity, and sudden transition

sion of measure, varying frequently from Allegro to Andante. When this little air was played or sung to the Swiss soldiers, they would express sighs and tears, and would not unfrequently desert in the impulse of the moment; and such as shewed silent dejection, and scorned so base a procedure, fell martyrs to their own feelings, by a disease called by writers *Nostalgia* *.

Xenophon, in his retreat of the ten thousand, gives a very lively description of the tumultuous joy which the army exhibited, when they first saw the sea from Mount Theches, where they instantaneously erected a trophy amidst the loudest acclamations. The strong emotions of the followers of Columbus upon seeing land, may be explained also partly upon this principle.

* A vehement longing after home.

SECT. XXXV.

DISAPPOINTMENT.

HIS late Majesty George II. having kept the audience waiting, much confusion arose in the theatre, and a hiss even reached the ear of Majesty upon his arrival. The King, with admirable presence of mind, took out his watch, and looking at it, appeared to say something to a lord in waiting, and, placing his hand to his breast, he bowed to the audience. This confession from so high a personage instantly overwhelmed the hearts of the whole assembly, and without exception the whole house joined in reiterated plaudits, and it was a long while before the effusion ceased, and the play could be proceeded with.

The excess of joy at finding a thing that has been given up as lost arises from the same principle.

S E C T. XXXVI.

HUNTING, WAR, AND GAMING.

CARDS were at first for benefits design'd;
 Sent to amuse, and not enslave, the mind:
 But from such wise end they must soon depart
 From this principle of the human heart,
 Which not in pleasure's self can pleasure find,
 Unless it comes with *agitation* join'd;
 Which, basking warm in fortune's sunshine clear,
 Sighs for the shifting clouds of *hope* and *fear*;
 And tir'd with looking on the listless deep,
 When lull'd by summer gales to silver sleep,
 Would rather far the tempest's fury brave,
 When danger rides on ev'ry foaming wave.

WHIST, A POEM.

IF we contemplate a savage nation in any part of the globe, supine indolence, and sometimes violent exertions, will be found to constitute their general character. In a civilized state, every faculty of man is expanded and exercised; and the great chain of mutual dependance connects and embraces the several members of society. The most numerous portion of it is employed in constant and useful labour. The select few placed by fortune above that necessity, can, however, fill up their time by the pursuit of ambition, by the improvement of their estate, by the duties, the pleasures, and even the innocent follies, of social life. These, by reading and reflection,

reflection, multiply their own experience, and live in distant ages and remote countries; whilst the former, rooted to a single spot, and confined to a few years of existence, surpasses but very little his fellow-labourer the ox, in the exercise of his mental faculties.

Their level life is but a mould'ring fire,
 ————— or if raptures cheer
 On some high festival of once a year,
 In wild excess the vulgar breast takes fire,
 Till, buried in debauch, the bliss expire.

The lazy savage, destitute of every art that can last out the day, if his hunting has procured enough, passes his time in the animal gratifications of eating and sleep. And yet, "by a wonderful diversity of nature," which could not fail to escape the observation of Tacitus, who has applied the *science of philosophy* to the *study of facts*, "The same barbarians are
 " by turns the most indolent and the most restless
 " of mankind. They delight in sloth, they detest
 " tranquillity. The languid soul, oppressed with
 " its own weight, anxiously required some new
 " and powerful sensation; and *war** and *gam-*

* The passion for war, in the savage breast, is strongly exemplified in the following history. When Constantinople was taken by the Turks, Irene, a young Greek of an illustrious family, fell into the hands of Mahomet II. who was at
 that

“ *ing* were the only gratifications most suited to this
 “ temper of mind.

“ The sound that summoned the German to
 “ arms was grateful to his ear. It roused him from
 “ his uncomfortable lethargy, gave him an active
 “ pursuit, and, by strong exercise of the body, and
 “ violent emotions of the mind, restored him to a
 “ more lively sense of his existence.

that time in the prime of youth and glory. His savage heart being subdued by her charms, he shut himself up with her, denying access even to his ministers. Love obtained such an ascendancy as to make him frequently leave the army to stop with his Irene. War relaxed, for victory was no longer the monarch's favourite passion. The soldiers, accustomed to booty, began to murmur, and the infection spread even among the commanders. The Basha Mustapha, consulting the fidelity he owed his master, was the first who durst acquaint him of the discourses held publicly to the prejudice of his glory. The sultan, after a gloomy silence, formed his resolution. He ordered Mustapha to assemble the troops next morning; and then with precipitation retired to Irene's apartment. Never before did that princess appear so charming; never before did the prince bestow so many caresses. To give a new lustre to her beauty, he exhorted her women next morning to bestow their utmost art and care on her dress. He that morning took her by the hand, and led her into the midst of the army, and pulling off her veil, demanded of the bashas, with a fierce look, whether they had ever beheld such a beauty? After an awful pause, Mahomet, with one hand laying hold of the young Greek by her beautiful locks, and with the other pulling out his scimitar, severed her head from the body at one stroke. Then turning to his grandees with eyes furious and wild, “ *This sword,*” says he, “ *when it is my will, knows how*
 “ *even to cut the bands of love.*”

“ In the dull intervals of peace, the Germans
 “ were immoderately addicted to deep gaming, and
 “ excessive drinking; both of which by different
 “ means, the one by inflaming the passions, the
 “ other by extinguishing his reason, alike relieved
 “ him from the pain of the want of employment.
 “ They gloried in passing whole days and nights in
 “ this tumult of the passions, and the blood of
 “ friends and relations often stained their numerous
 “ assemblies. The desperate gamester, who had
 “ staked his person and liberty on the throw of the
 “ die, such was the point of honour among these
 “ barbarians, or rather depraved obstinacy, as Ta-
 “ citus more justly styles it (*ea est in re prava per-*
 “ *vicacia, ipsi fidem vocant*), that they patiently
 “ submitted to the decision of fortune, and suffered
 “ themselves to be bound hand and feet, and sold
 “ into remote and cruel slavery by his weaker and
 “ more lucky antagonist.”

SECT. XXXVII.

LICENTIOUSNESS.

COLONEL GARDINER, a gentleman of fortune, who, to all the advantages of a liberal and religious education added every accomplishment that could render him most agreeable, early entered into the army, and was soon called into actual service, at which time he behaved with a gallantry and courage, which will always give a splendour to his name among the British soldiery, and render him, in this respect, an example worthy of their imitation. But, alas! amidst all the intrepidity of the martial hero, you see him vanquished by the blandishments of pleasure, and plunging into the most criminal excesses. Before he had attained the age of twenty-two he fought three duels. In the battle of Ramillies, he was shot through the neck, and by a singular intervention, as it were, of Providence, when the strippers of the dead came to him, and had taken up an instrument wholly to abolish life, being faint and speechless from loss of blood, a friar interfered, and some spirits being given him, he was revived, and made prisoner. He still, however, lived without a sense of God or religion. After his exchange he rose gradually in the army, till at last he became aid de camp to Lord Stair. He then went

to Paris, during the regency of the Duke of Orleans, and lived in a court the most dissolute in the world. What, by a wretched abuse of words, is styled gallantry, was the whole business of his life, and his fine constitution, fascinating person, and elegant address, gave him full opportunity of indulging in every excess, so that he generally went by the name of the *happy* Englishman. When returning to England, as he was going post upon a French horse, the animal fell with him, and he was picked up for dead. When in the packet-boat a few weeks after, a violent storm arose, and the vessel was driven on the coast of Holland, and the ship was in so much danger, that the captain urged all in turn to prayers. It was then that Colonel Gardiner first seriously considered the follies and the crimes he had been guilty of; that he was not sent into this world for naught; that he had neglected the part assigned to him; had degraded his own nature; and, instead of being useful, had been hurtful and pernicious among those with whom he had acquaintance. What account was he to give to his Maker? Self-condemned, polluted by so many crimes, how was he to find mercy in the sight of God? Hence, an overwhelmed and dejected mind; hence dismal forebodings of punishment; hence that wounded spirit, which who can bear? His prayer was long and fervent, and troubled with many tears. The mercy of God was again shewn him, but among his giddy and dissolute companions he soon after endeavoured

voured to excuse himself the scandal of "*having prayed.*" In July 1719, having made an assignation with a married lady, a woman of rank, on a sabbath evening, to kill time he went to a neighbour's house, and the master being suddenly called out, he stumbled upon a book, whether placed there by accident or design I do not remember, which was called the *Christian Soldier*: as the hour was not yet arrived, he took up this book, and from the title he had curiosity to dip into it. Some passages struck his attention, and he read on until he fell asleep. He dreamt he saw an unusual blaze of light poured upon the book, and he afterward had a strong visual representation of the Lord Jesus Christ upon the cross, surrounded on all sides with glory, who addressed him, "as an ungrateful sinner, despising the numerous mercies shewn him." When he awoke, the impression was so vivid, that he could scarce conceive it had been a dream; he then looked back with horror on his past life; he would fain have kneeled down and asked pardon of God, but he thought he was a monster as yet too vile to supplicate; he never once remembered the assignation, but went home, and passed this and the three succeeding nights, without the refreshment of sleep, in fasting and in prayer. His mind was continually taken up in reflecting on divine purity and goodness; the grace, which had been proposed to him in the gospel, which he rejected; the singular advantages he had enjoyed and abused; the many

mercies

mercies he had received and despised, with the vain folly of that career of pleasure, which he had been so many years running after with desperate eagerness, all roused his indignation against the great Deceiver, by whom, to use his own expression, "he had been so wretchedly befooled." Thus the whole frame and disposition of his soul was new modelled and changed; and he became, and continued to the very last, a most pious and exemplary Methodist.

In the year 1140, that is to say, a little more than six hundred years ago, a count of Perch, who had led a very irreligious life, made a vow, during a violent tempest, that if he escaped shipwreck, he would found, upon his estate, a monastery, and that the roof of the church should have the form of a ship's keel. Upon his return to his domain, he chose, for the situation, a wild valley, very low, and the only descent was by a narrow passage, hence the name La Trappe. The regulations of this convent were exceedingly austere. By degrees its manners became relaxed, when a singular adventure gave rise to the greatest reform in this institution. The estate fell by inheritance to M. L'abbé de Rancé, a man of a good family, and naturally of a benevolent heart, but given up to an unfortunate amour. As he returned from a journey, having been absent but a few days upon business, on his arrival he went to his beloved mistress, a woman of the greatest beauty and vivacity, and by means of
a key

a key he passed along a dark passage, and ascending by a private stair-case, opened the door of her chamber, when lo ! instead of the beauteous Mon-bazon, he beheld, by means of a blue lamp, a head besmeared with blood on the toilette, and casting his frantic eyes around, he saw a coffin in which she was placed, which, being too small, the head had been cut off, and put in a dish upon the table. This frightful spectacle inspired him with the resolution of abandoning the world, and of entering into the convent of La Trappe, where he introduced all the austerities of St. Barnard.

Now did REMORSE efface the guilty scene,
Which to his breast apply'd her dagger keen,
Restrain'd in full career the erring youth,
And led him back to innocence and truth :
'Twas *here* he fled, divorc'd from pleasure's chain,
To woo religion in this gloomy fane,
To wash away with tears his errors past,
And spend each day, as though it were his last.

The monks of La Trappe never speak, they eat only vegetables, and drink water ; they rise every morning at two, and after matins they make themselves a grave, in remembrance of their mortal state ; they wear camlet next their skin, and lie upon straw. In the place where they assemble to warm themselves, which is the only indulgence they take, over the fire-place there is the picture of a most beautiful woman, and a person turns it every five minutes, when a half putrified skeleton appears which is painted on the back.

SECT.

S E C T. XXXVIII.

OF THE MODUS OPERANDI OF SEDATIVE POWERS.

IN considering the laws of the fibrous system, we contemplated several INDIRECT STIMULI, as Impure Air, Darkness, Cold, Hunger, Rest, and lastly Sleep ; and tracing their effects on the animated body, we were enabled from these to establish a General Law ; but whether they had any *direct operation* of their own, or only *predisposed* (by not consuming irritability) *the fibre to greater action when the direct stimuli should be applied*, as Pure Air, Heat, Light, Exercise, Food, &c. was not determined.

So of INDIRECT NERVOUS STIMULI a dispute still remains unsettled, whether these are only *negative states*, the *abstraction* of some powerful exciting emotion ? or, whether they have a *direct distinct power* of their own ?

Girtanner and Brown say, the passions differ from each other only in stimulating the irritable fibre more or less. Anger and joy are very powerful-degrees of the nervous stimulus ; content and hope are lower degrees ; fear, despair, and sorrow, are not absolute degrees of this stimulus, they are

* We however inclined to this last opinion.

only the *abstraction* of the stimuli of hope, content, and happiness. Anger and joy act as very powerful stimuli, and exhaust the irritability of the fibre in the same manner as any other stimulus whatever. Content and hope are degrees of the nervous stimulus necessary to preserve the tone of the fibre. Sorrow and despair are degrees too weak.

In a discourse on taste, written by Dr. Usher, we find nearly the same sentiment. The opinion I mean to propose, says this elegant writer, is that of a friend of mine, who was a true lover of knowledge. He found little satisfaction in the philosophy of colleges and schools, particularly in those inquiries he thought of most importance: he had withdrawn himself from the trifling bustle of the little world, to converse with his own heart, and end a stormy life in obscure quiet. One day, after dinner, we walked out to indulge on our favourite topic. Our excursion terminated at a rock, whose base is washed by the western ocean. It was one of those fine days in August, when the cool of the evening brought on a refreshing sweetness. We sat down to rest and enjoy the prospect of the sea, that stretched before us beyond the limits of the eye. The sun was just setting, and his last softened beams flying to the shore, seemed to dip in a thousand waves, and leave in the waters the blaze they lost. Being seated, our conversation turned on the *sublime*. It is easy, says this thoughtful philosopher, to describe the impressions the sublime make on the mind,

mind, and this is all the writers on this subject have hitherto done; but is it impossible, from a due attention to the symptoms, to *unravel* its meaning, and *discover* the *spring* of the silent astonishment it impresses on the spirit of man? In order to proceed to the discovery we desire to make, let us turn our views to objects remarkably sublime, and from them obtain what intelligence we can. Observe this mountain that rises so high on the left, if we had been further removed from it, you might see behind it other mountains rising in strange confusion, the furthest off almost lost in the distance, yet great in the obscurity; your imagination labours to travel over them, and the inhabitants seem to reside in a superior world. But here you have a different prospect; the next mountain covers all the rest from your view, and by its nearer approach, presents distinctly to your eye objects of new admiration. The rocks on this side meet the clouds in vast irregularity; the pensive eye traces the rugged precipice down to the bottom, and surveys there the mighty ruins that time has mouldered and tumbled below. It is easy, in this instance, to discover that we are terrified and silenced into awe, at the marks we see of immense power; and the more manifest are the appearances of disorder, and the neglect of contrivance, the more plainly we feel the boundless might these rude monuments are owing to. The same sensation arises when we behold an ocean disturbed and agitated in storms; or a forest

forest roaring, and bending under the tempest. We are struck by it with more calmness, but equal grandeur, in the starry heavens: the silence, the unmeasured distance, and the unknown power united in that prospect, render it very awful in the deepest serenity. Thunder, with broken bursts of lightning through black clouds; the view of a cataract, whose billows sling themselves down with eternal rage; or the unceasing sound of the falling waters of night; all these produced the effect of the sublime, and are associated with the sensation of immense power. This religious passion has none of the tumult of other passions, its object is incomprehensible, it is unknown; therefore the passion is in itself obscure, and wants a name. Curiosity and hope carry with them the plainest symptoms of a passion that wanders and is astray from its object. In their anxious search, they unite themselves with every great prospect of life, whose completion lies in the dark: but when we arrive at the point we proposed, we are fully sensible that curiosity and hope have been deceived, the enjoyment of our power, whatever it be, falls infinitely below our expectations, yet the alacrity of the mind feels no decay by disappointment; we set out immediately with renewed vigour in pursuit of something further, and nothing but death puts an end to these active energies of the soul. Such passions as these are scared away by the majesty of darkness and of silence, by the disorder and confusion of seas in storms, or when lofty
woods

woods struggle with high winds, and we are struck with humiliating awe and suspense. We secretly cry, "What is man that thou art mindful of him, and the son of man that thou shouldest regard him?" I appeal to the feeling of every person, if his passion, under these circumstances, be not exactly applicable to this state of the mind, when confidence almost vanishes, and despair succeeds. All mankind agree, that darkness, solitude, and silence, naturally oppress the mind by a tremendous and sublime sensation. It is further evident, *that they produce not* (continues Dr. Usher) *this effect* BY ANY ACTIVE POWER OF THEIRS, *but merely by stripping the imagination of its sensible ideas, of the noise, the mirth, and light, that diverted its attention, leaving it to its naked state and feeling.*—In short it appears, from a great variety of observations and reflected lights, that the human soul is always *oppressed* by obscurity and stillness, which prevents the mind from being employed on exterior objects. To avoid *this sensation* it is that we seek amusement and company, and that any diversion, however insipid and trifling in itself, becomes to us a pleasing relief, merely by taking up our attention. Reason may smile at the puerility of our amusements. The votaries to the pomps and vanities of the world acknowledge they will not bear examination: yet the wise and the vain find solitude alike insupportable, and alike desire the company and the pageantry they despise. Men easily bear imprisonment, poverty, sickness, and even

even great degrees of pain; but the obscure despair, whose object is not known, is blacker than the grave, and more terrible than death, and to plunge from it men commit suicide. Every calamity of this life is supportable, and we suffer them by choice rather than death; until they bring us to a pensive solitary state of mind, in which we feel the *pressure* of an unknown power; and then men often make the cruel choice, and seek death as a welcome release from that *insupportable ennui* which thus overpowers them.

The illustrious Dr. Beddoes, on the other hand, opposes the doctrine, *that the depressing passions, as they have been called, are only the abstraction of the ordinary exciting passions.*—"Universal experience, I apprehend," says he, "will reject such a scale of mental affections, as this system supposes. Who can believe," says this philosopher, "that in sorrow the mind is *less active* than in joy? As an example."

K. PHIL.

Patience, good lady! comfort, gentle Constance!

CONST.

No, I defy all counsel, all redress,
But that which ends all counsel, all redress,
Death, death: come grin on me,
And I will think thou smil'st,
And bus thee as thy wife!

K. PHIL.

Oh fair affliction, peace.

CONST.

No, no, I will not, having breath to cry ;
 Oh, that my tongue were in the thunder's mouth !
 Then with a passion would I shake the world ;
 And rouse from sleep that fell anatomy,
 Which cannot hear a lady's feeble voice.

PAND.

Lady, you utter *madness*, and *not sorrow*.

CONST.

I am not mad ; this hair I tear is mine,
 My name is Constance, I am Jeffery's wife ;
 Young Arthur is my son, and he is lost !
 I am not mad, I would to heav'n I were !
 For then 'tis like I should forget myself.
 Oh, if I could, what grief should I forget !
 I am not mad ; too well, too well I feel,
 The diff'rent plague of each calamity.
 If I were mad, I should forget my son.

K. PHIL.

You are as fond of grief as of your child.

CONST.

Grief fills up the room of my absent child,
 Lies in his bed, walks up and down with me ;
 Puts on his pretty looks, repeats his words,
 Remembers me of all his gracious parts ;
 Stuffs out his vacant garments with his form,
 That I have reason to be fond of grief.
 There was not such a gracious creature born !
 But now will *canker SORROW eat my bud*.

And

*And chase the native beauty from his cheek,
 And he will look as hollow as a ghost ;
 As dim and meagre as an ague fit ;
 And so he'll die ;—and rising so again,
 When I shall meet him in the court of heav'n,
 I shall not know him ; therefore, never, never,
 Must I behold my pretty Arthur more !*

The followers of Dr. John Brown must indeed acknowledge that grief, accumulated grief, is sometimes an active passion*, by raising continued images to the mind, and may destroy by excess of one continued unchangeable excitement, but *grief*, they observe, in general soon sinks into *despondency*.

* Hence, when treating of the exhaustion of the irritable principle by excessive action, we have there considered grief in excess, or rather *distracted*, as an active exhausting power.

SECT. XXXIX.

AN EXAMPLE OF THE SEDATIVE EFFECTS OF
GRIEF.

Panters depict true grief with a mantle about his head, and
silent.

LOQUACIOUS grief better suits the stage than as a real, faithful, representation of great and genuine sorrow. In the same play selected in the last section by Dr. Beddoes, and upon the same occasion, how naturally does Lewis, upon hearing the death of young Arthur, say,

There's is *now* nothing in this world can make
me joy.

LIFE is as *tedious* as a *twice told tale*,
Vexing the dull ear of a drowsy man.

The history of the honest Maison-rouge is a striking example of the *sedative effects* of silent grief.

Mademoiselle de Launay, afterwards Madame de Staal, and many other persons of the household of the Duke and Duchess of Maine *, were arrested

* The regent had some time before been informed of a secret correspondence of the Duke and Duchess of Maine with the court of Madrid, through the means of the Spanish ambassador, the Prince of Cellamare. He got intelligence, that some dispatches of great importance had been sent away by the
the

ed and sent to the Bastile on the 29th of December. The Duke of Maine was seized at his house at Seaux, and sent to the castle at Dourlens; and the Duchefs at the Hotel de Thoulouse in Paris, and sent to Dijon.

They put me, says Madame de Staal, into a coach about seven in the evening, with three musketeers. I imagined the journey would not be long, and that they were carrying me to the Bastile. We accordingly arrived there. They made me get out

the Abbé de Porto Carero, and concealed in a double bottom that had been made to his chaise for that purpose. It is said, that he first received this information from a woman that kept a house of pleasure, who, like many others of the same profession, was personally known to the regent, and was now employed by him as a spy. The ambassador's secretary one day excused himself for not keeping an appointment at her house, by saying, that he had been engaged with dispatches that were but just sent off by the Abbé Porto Carero. Notice of this was immediately given to the regent: on inquiry the circumstance was confirmed; orders were sent to arrest and examine the abbé; he was stopped at Poitiers; the dispatches were taken from him, and he was permitted to proceed on his journey. After reading them, the regent ordered the ambassador's house to be surrounded with guards, and searched. This intrigue had been chiefly managed by the Duchefs of Maine. It appears, that her views principally went to dissuade the court of Spain from acceding to the quadruple alliance, to engage it to use its influence to obtain an assembly of the States in France, and to get the assembly to enforce the will of Louis XIV. and the dispositions that had been made by him in favour of his legitimated natural children.

at a small bridge, where the governor received me. As soon as I entered, they pushed me behind a door, as some of our party arrived at the same time, by whom they did not choose I should be seen.— Those being put into their cages, the governor conducted me to mine.

My room had only the bare walls bedaubed with charcoal, the pastime of my predecessors. They brought a straw-bottomed chair; two stones to support a faggot with which they made a fire; they very ingeniously stuck a tallow-candle against the wall; these conveniences being procured, the governor left me, and I heard five or six monstrous bolts locked behind him.

At last, the governor made his appearance again, bringing Mademoiselle Rondel * with him. She asked him, in a very deliberate manner, if we were to lie upon the floor. He answered with a sort of merriment, which we thought out of season, and left us.

While we were thus in conversation, our doors opened with great noise. Indeed this cannot be done otherwise. They † desired us to go into another room, but without saying why. They don't give reasons here, and every one you see has something in his face that tells you not to ask any questions.

* Her maid, and companion in her prison.

† The turnkeys, who had come in.

The night was far advanced, and we neither saw beds nor supper; but shortly afterwards, they came and took us back to our former room. I now found here a small bed, neat enough; an arm-chair, two other chairs, a table, a basin, an earthen pot with water, and a kind of truckle-bed for Rondel. She did not like her bed, and complained; but she was answered, that they were his Majesty's beds, and that she ought to be content. No reply could be made to this:—they went away, and shut us up as before.

To procure the most simple necessity that we are apprehensive of being deprived of, affords more joy than the greatest piece of luxury to those who are in want of nothing. I was exceedingly pleased to see my bed; I began to wish for my supper, and recollected the musketeer, who had advised me to eat some dinner. It was now eleven. The supper at last came, but very late: the great business of the day had occasioned some derangement, and I was not a little surprised to see served the day following at six o' clock, what to-night I had so long waited for. I supped, I lay down, and fatigue and oppression would probably have made me sleep, had I not been prevented by a bell that the sentinel struck every quarter of an hour, to shew that he was awake.

Monsieur de Launay, the governor of our castle, had taken possession of his office but the day we arrived there. His predecessor, Monsieur de Berna-

ville, died the day before. De Launay was his relation and pupil, and he had perfectly fashioned him to all the practices of the jail. He came to see me the next morning; and as he affected an air of pleasantry, I did the same. He already found me perfectly tamed. I asked him for some books and cards. He sent me some odd volumes of Cleopatra, which I made the most of, and played at piquet with Rondel.

We shall have a fine opportunity, says Rondel, on Sunday, at the chapel, to see the other prisoners of the castle. But she was mistaken. I was concealed in a niche where I neither could see nor be seen.

Being entirely occupied with other thoughts, I had paid so little attention to what I brought with me, that I was soon in want of every thing. I had no other corset, but the one on my head; nor any more shifts than a heroine of romance, who has been suddenly run away with. My only resource was in the industry of Rondel, who washed my linen in the basin in which we washed our hands. While she was washing the corset, I put on my head the only handkerchief I had left, and it was in this extreme dishabille I received the first visit of the Lieutenant du Roi. No situation can prevent a woman's being displeased, at appearing to disadvantage before one she sees for the first time.

Mons. de Maison-rouge, who had lately got this place, had been a major of cavalry, and never had
seen

seen any thing but his regiment. He was an honest open soldier, full of excellent qualities, which were by no means disgraced by a certain rusticity and bluntness, that seemed naturally allied with them. He endeavoured to comfort her, but, she proceeds, this sort of conversation appeared to me extremely suspicious;—I thought he wanted to ensnare me;—I did not know him then.

When my wants were at the utmost, the governor came into my room one day with a purse of gold, and followed by a man carrying a large bundle of my clothes. I should not have known from whence they came, if I had not recollected the purse which I had worked and given to Monsieur de Valincourt. He was not afraid to avow his solicitude for me, at a time when my other friends would not acknowledge my acquaintance.

I should now have found some repose, had it not been for an idea that unfortunately got possession of my mind, and almost constantly disturbed it. Some days before I was arrested, happening to speak of the Bastille to the Abbé Chaulieu, he told me a story of a woman of rank, who, to make her declare her secrets, had been privately put to the torture. As I was thought to be in the confidence of the Duchess of Maine, I imagined, that if they had recourse to that expedient with any one, it would be with me. I had a wonderful desire to examine this matter, but I knew not how to go about it. One day that our Lieutenant du Roi came

came to see me, I ventured to bring the discourse upon things I had been told about the Bastile; but he treated them as childish stories. At last, lowering my voice, as people generally do when they are embarrassed and afraid, I said, it was even pretended that persons had been put to the torture without any form of trial. He made no reply. We were walking up and down the room; he took another turn, and went away, I thought, a little too abruptly. I remained confounded; and almost persuaded that I was destined to undergo this horrid ceremony. I imagined he knew it—I continued walking with immensely long steps, and making profound reflections. I found out afterwards that the lieutenant was deaf of one ear, and that I had got on his deaf side when I addressed my last observation to him. I have often laughed since at the fright his supposed circumspection then occasioned me.

The governor asked her, if she wished to confess; she desired it exceedingly, but wanted a confessor of her own choosing. He told her that was impossible, and she must be satisfied with the confessor belonging to the castle. To a mind already tainted with distrust, this was enough to rouse it. She imagined the confession might be made use of to obtain her secrets. She was for some time perplexed between her duty and her fears; her devotion, however, prevailed, and she says, "Never was any suspicion more unjust; I found him (the confessor)

“ confessor) full of goodness, simple, and compaf-
 “ sionate; more difpofed to pity me for my mis-
 “ fortunes, than reprove me for my faults.”

The following paffage fhews the extreme pre-
 caution that was obferved at the Baftile, to prevent
 the prifoners from having any communication with
 perfons abroad.

“ Throwing myfelf on my knees before the go-
 “ vernor, I entreated him to write with his own
 “ hand a note that I fhould dictate, to Madame de
 “ Grieu, merely to relieve her from the terrible
 “ ftate of anxiety in which I knew ſhe muſt be on
 “ my account; but he was inexorable, fearing that
 “ the plainefſt expreſſions, though written by him-
 “ ſelf, might convey a hidden meaning.”

The Lieutenant du Roi, the honeſt Maifon-rouge,
 became the captive of his prifoner. “ Though he
 “ did not explain himſelf clearly, all his actions
 “ proved it. An attention to all my wants, that
 “ never diminifhed; a complacency, without affec-
 “ tation; a greater defire to fee me ſatisfied, than
 “ to pleaſe me; and a mind ſo much devoted to
 “ me, that he ſeemed to forget his own exiſtence.
 “ I have never been a witneſs in real life, or read
 “ in romance, of ſentiments ſo pure: ſentiments
 “ that were invariable; and ſo much the more va-
 “ luable, as they were not the effect of reaſoning
 “ and refinement, but of ſimple nature; who
 “ ſeems to have taken pleaſure in making a
 “ heart, of which ſhe could ſay, “ *Here at leaſt*
 “ *is*

*“ is one, in which there is nothing to be found fault
“ with.”*

Near her apartment was that of the Chevalier de Menil. They never had seen each other; but the similarity of their situations, and their common danger, made her take an interest in what concerned him. Maison-rouge, who was constantly thinking of ways to amuse her, proposed to Menil to write her some verses. The verses were answered; they were followed by letters; the letters by visits; and those produced a mutual passion, that had been already prepared by sympathy. It was declared by the one, and soon avowed by the other. She says,
*“ Le pays que nous habitons abrège beaucoup
“ les formalités. Par-tout ailleurs j’eusse été long
“ temps sans vouloir écouter; plus long temps en-
“ core à répondre; mais dans un lieu, où, parvenus
“ à se voir, on ne fait pas si l’on se reverra jamais,
“ on dit en une heure ce que, hors de là, on n’eut
“ pas dit, peut-être, dans une année: et non seul-
“ ment on y parle, mais on y pense tout autrement
“ qu’on ne feroit ailleurs.”—“ The country we
“ inhabited abridges much of formality. Every
“ where else I should have been a long time with-
“ out listening to, yet longer in answering, such
“ declarations; but in a place where we might
“ never meet each other again, one says in an hour,
“ what otherwise, perhaps, one had not said in a
“ year; and not only speak, but think different
“ from what we should do elsewhere.”*

One

One day that the Lieutenant du Roi was abroad, the governor met the Chevalier de Menil returning from the apartment of Mademoiselle de Launay to his own. The offence was punished, by his being removed to another tower, and confined with greater rigour. In her distress, she resolved to avow to Maison-rouge her passion for Menil; to entreat his good offices for him, and get him to facilitate their correspondence. She says, "He remained for some
 " time as if lost in a confusion of sentiments; but
 " the effects of my affliction, and of the confidence
 " I had placed in him, began to shew themselves
 " on his countenance. At last, making an effort to
 " explain himself, he said: You know how much
 " I am devoted to you; I will now give you a
 " proof of it, but you must explain the nature of
 " your connexion with Monsieur de Menil. If
 " his intentions are pure, if he means to make you
 " honourably happy, I will give myself up without
 " reserve to every thing that can contribute to *your*
 " welfare: but unless his conduct be unquestion-
 " able, it would be unworthy of you to have any
 " farther communication with him, and it would be
 " disgraceful to me to have been employed in it."

Having satisfied him, that nothing had ever passed between them with which virtue or modesty could be offended, and that they were pledged to each other in marriage, they, through his means, daily wrote to each other; but, says she, "he has avow-
 " ed to me since that, every letter we delivered to
 " him

“ him was a *poignard* plunged into his bosom; yet
 “ he was not the less exact in faithfully observ-
 “ ing the rules he had established for our cor-
 “ respondence.”

By an order from the regent, the Chevalier de Menil was allowed a greater degree of liberty; he now dined frequently with the governor, and spent much of his time with the duke of Richlieu, who was then likewise in the Bastile.

The Duke and Duchefs of Maine having been permitted to return to *Seaux*, the prisoners in general, who had been arrested on their account, were treated with less severity than before. They were allowed to visit each other, and they generally met in the evenings at the apartments of a Madame de Pompadour. Madame de Staal, at this period of her imprisonment, says, “ My connexion with
 “ Menil, however painful to Maison-rouge, had
 “ been softened by the opportunity he had of be-
 “ ing useful to me. He conducted our corre-
 “ spondence; and, as he knew all we did, it set li-
 “ mits to his anxiety: but, by this change, even
 “ that sort of consolation was taken away, and there
 “ only remained gratitude for services we no longer
 “ stood in need of.” He said, “ You are now
 “ happy; I wished it. Live in peace with one
 “ you love, but do not exact from me; that I
 “ should witness it. As long as my services were
 “ wanted, I surmounted my feelings; I should do
 “ the same if you again stood in need of them,
 “ but . . .

“but they are no longer necessary.”—She however insisted that he should continue to visit her; he was unable to refuse, but it only tended to confirm *the passion that carried him slowly to his grave.*

The Chevalier de Menil was set at liberty, but exiled to his estate at Anjou. She was detained some months longer. The correspondence by letters was renewed: but Menil, now at liberty and among his acquaintances, was less passionate and exact than Menil in the Bastile.

Being at a window, I saw Maïson-rouge coming in a great hurry across the court with a paper in his hand. He entered my room in a state of perturbation that alarmed me. While I was looking at him with astonishment, he gave me the paper—it was the lettre de cachet that set me at liberty:—
 “You are now free,” said he, “and I lose you—
 “I most ardently desire this moment.—I would
 “have given my life to procure your liberty—
 “it is obtained, and I shall cease to see you!”

Mademoiselle de Launay was discharged from the Bastile on the 6th of June 1720.—The cat, that had amused her in her solitude, became the favourite companion of Maïson-rouge.—He says, in a letter to her, dated the 7th, “I wished you
 “away—you are gone, and *I am wretched.*”

The robust health of Maïson-rouge from this time gradually declined. To restore it, he was sent to drink the waters in his native province, where in a few months he *ended his life, “of which he had
 “long been weary.”*

Mademoiselle

Mademoiselle de Launay resumed her place about the person, and in the confidence, of the Dukes of Maine. But the impatience of de Menil to see her, fell infinitely short of what she had expected. The impressions he had received, while a prisoner like herself, were gone off; and after a few months spent in pretexts on one hand, and disappointment on the other, their connexion ended. Rondel was taken into the service of the Dukes of Maine.—Mademoiselle de Launay refused several proposals of marriage, and, among others, of Dacier, after the death of his celebrated wife. She at last married Monsieur de Staal, an officer of a good family, but small fortune, and a widower with two daughters. She died at Passy, on the 15th of June 1750.

PRACTICAL OBSERVATIONS

SECT. XL.

THE RATIONALE OF THE SEDATIVE EFFECTS OF
GRIEF.

THE general corporeal effect of all the modifications of grief and sorrow, is a torpor in every irritable part, especially in the circulating and absorbent systems; hence the paleness of the countenance, the coldness of the extremities, the contraction and shrinking of the skin, and general surface of the body; the smallness and slowness of the pulse, the want of appetite, the deficiency of muscular force, and the sense of general languor, which overspreads the whole frame.

As the action of the extreme branches of the arterial system is greatly diminished, the heart, and aorta, and its larger vessels, and the whole system of the pulmonary artery, become loaded and distended with blood. The painful sense of fullness which this occasions, gives rise to a common expression, which is, in some degree, descriptive of what really exists; in sorrow the heart is said to be *full*, and in deep sorrow it is often said to

be *like to burst*. A sense of oppression and anxiety, a laborious and slow respiration, and the remarkable phenomena of sobbing and sighing, naturally arise from this state of torpor, and retarded circulation.

Sobbing and sighing are peculiar to certain degrees and kinds of mental pain; as laughter, jumping, and dancing, are peculiar to certain kinds of joy. They are not, however, of so intricate a nature as laughter. The way in which they are to be accounted for, is this: as the blood is accumulated in a much greater degree than usual in the large trunk of the pulmonary artery, and in the aorta, it is not so quickly *oxygenated* as it ought to be; for the healthy oxygenation of the blood cannot take place except it be circulated with a certain degree of quickness; but as it is the nature of our constitution that an obscure pain should arise when the actions which are necessary for our preservation are neglected, or impeded, and as this pain generally operates as a stimulus to excite these actions, so in this case the preternatural accumulation of blood about the heart produces an uneasy sense of fulness, to relieve which, we take a deep and quick inspiration; and this constitutes the first part of sighing: but the debility arising from the primary action of grief being great, the breath is not retained, and slowly thrown out, as in ordinary respiration,

but,

but, on the contrary, the whole quantity seems suddenly to escape ; and hence the act of sighing is completed. By this means, the lungs being greatly distended with air, the large branches of the pulmonary veins are compressed, and a great quantity of blood is consequently forced out of the lungs. The blood is thereby *oxygenated*, and the congestion which had taken place on the right side of the heart, relieved. The *oxygenation of the blood* is the ultimate end of sighing, as, indeed, it is of every act of inspiration ; the exciting cause is a physical one, namely, the distention of the larger blood-vessels of the pulmonary system : sighing, therefore, may take place in every case of continued grief, or sorrow, from whatever cause these proceed. It also often takes place from bodily causes, which produce a diminution of strength, or torpor in the whole frame, especially in the organs of respiration ; and therefore we find that it is a common attendant on almost every case of chronic weakness, such as the various stomatic complaints which come under the denomination of dyspepsia ; but sobbing is the peculiar effect of certain kinds of mental pain only. When the pain to which we apply the name of grief is powerful and recent, and the ideas which give rise to it are of such a nature as to fall on the mind by repeated concussions, as it were, the sensorial impressions of these ideas are transmitted to the diaphragm with the same kind of forcible

repetition as the ideas act on the brain. These impressions, when they arrive at the extremities of the nerves supplying the diaphragm, act like physical stimuli to that muscle, and throw it into an interrupted, convulsive action. On the one hand, therefore, the mechanical stimulus, arising from the distention of the pulmonary artery and vein, together with the want of oxygenation of the blood, which are circumstances common to all kinds of grief, are causes which produce the act of deep inspiration, and *sighing*; and, on the other hand, the peculiar mode in which the painful ideas act, causes the external air to be often interrupted, and thus the phenomena of *sobbing* are superadded to those of *sighing*.

Upon what general physiological principle do grief and sorrow act, so as to produce the various phenomena before-mentioned?

The common way of accounting for them is, by saying that grief and sorrow, and their modifications, are depressing, or debilitating passions; and hence they always occasion a diminished action, which must be followed by general torpor and languor. But this is not explaining any thing; for the question is, in what way do they produce this depression of vital energy, this sense of universal weakness and languor? I have before endeavoured to confirm the opinion of the late Dr. JOHN BROWN, that debility may be produced by very opposite kinds of causes: *first*,
directly,

directly, by withdrawing or diminishing the quantity of natural stimuli which support all action; and, *secondly*, by the action of too great stimulants; by which the whole body, or the parts on which their action is exerted, are left in a state which is very properly called *indirect debility*. It is to be recollected, that the stimuli which produce indirect debility, are of two kinds, one of which evidently excites action in the vascular system, the other exhausts the principles of life quickly, but in a very obscure manner, without any evident previous increase of vascular action whatever. The debilitating powers of grief seem *generally* to operate in this last-mentioned manner; they exhaust the irritability of the system without a previous increase of vascular action. When a person is suddenly informed of some melancholy event that deeply affects his life, fortune, or fame, his whole strength seems at once to leave him; the muscles which support him are all relaxed, and he feels as if his knees gave way under him. In many cases he actually sinks down. In some people the sensorial impression exhausts the irritability so completely as to cause the action of the heart and arteries, and organs of respiration, to cease, and the person then falls into a *f swoon*, as it is called. The irritability is slowly and scantily regained during this swoon, and therefore it often continues a great length of time. When it is sufficiently accumulated in the system to render
the

the person sensible of the common external stimuli, such as heat and light, he awakens from the torpid state in which he lay; but then the melancholy thought may again recur to his mind, in which case it again produces a renewal of the *syncope*. This effect may take place repeatedly, and ultimately lay the foundation for many chronic complaints of the nervous kind.

When any cause of deep grief and sorrow is present to the mind, it frequently gains such a force as almost totally to exclude all thoughts except those which, upon the principle of association, are connected with it. As the attention is strongly excited by it, a person feels an irksomeness when much exposed to impressions on his external senses; for although these impressions do not produce a clear representation in the mind, inasmuch as the attention of the person cannot be directed for a sufficient length of time to them, yet they necessarily reach the mind, and, as it were, irritate it. There is no cause which prevents the external impression from being conveyed to the brain, and when it produces a sensorial impression there, it operates in a slight degree on attention, so as to withdraw it for a second or two, but the attention is immediately afterwards re-excited by the prevailing ideas; and thus, when a melancholy person is exposed to strong impressions on the external senses, he experiences an uneasiness or mental irritation, which is much
more

more insupportable than grief itself ; he therefore avoids society, and the conversation of his friends ; he loves quiet, solitude, and darkness, and in these he broods in silence on the thoughts which seem to him so materially to affect his interest or happiness.

The melancholic person, for similar reasons, avoids bodily exercise ; and thus, that which is a first effect of the debilitating powers of these mental affections, becomes an agent of greater debility. Indeed, this is altogether the character, and nature of every painful passion. Every effect becomes an active cause of a new series of baneful consequences. The loss of vital energy which is occasioned by grief, or sorrow, and the want of exercise, cause a deficiency of appetite and of the powers of concoction and chylicification. Nor is this to be wondered at when we reflect on the torpor which pervades the whole frame, and the great alteration which grief occasions in the circulatory system. The want of action in the vessels of the skin, occasions a sympathetic affection of the stomach. There is a singular affection of this organ which is almost singular to grief ; it consists in a violent pain, which is commonly felt at the pit of the stomach, and is often so great as to cause the person to emit deep and involuntary groans, or moanings ; when it is very violent, it generally terminates in a regular ^{*} hysterical fit, or in convulsions, or in a mild and low delirium,

5

which

which seldom continues above twelve hours. Of this singular affection I have lately met with several cases, all of them proceeding from deep grief. This pain might easily be mistaken, in some cases, for gastritis, or inflammation of the stomach, if a person was not very attentive to all the symptoms; for it often is permanent for some days, during the whole of which time the patient vomits whatever is swallowed. Now the constant and acute pain, and the vomiting on taking food, might easily deceive a practitioner. It may be distinguished, however, from gastritis by the pulse, the state of the skin, and the general expression of the countenance; for the pulse is seldom quick, and the skin is generally cold, and, to a discerning eye, the disease may be read in the looks of the patient.

As a physician, however, like every other man, may be deceived in the judgment he forms from any expression of countenance, especially as bodily pain often causes the features to assume the look of dejection and sorrow, he must not trust to it alone. This painful affection from grief is almost peculiar to *females*, for, on their delicate frame, mental causes of every kind operate, in general, much more powerfully than on men.

As grief and sorrow, and their modifications, cause a preternatural accumulation of blood in the larger blood-vessels, owing, in a great degree, to the torpor and inirritability of the heart
and

and arterial system ; and as the vessels of the liver are, from their size and situation, liable to be much affected by all such changes, it is natural to imagine that the functions of this viscus should be greatly changed, owing to the unusual load of blood which is thrown on it ; and the unusual slowness with which it is circulated. There can be no doubt that the *bile*, in many melancholic patients, is completely altered from what it is in health. In a great number it has been found of a deep green colour, in others of a dark brown, and in others of a brownish black. In many, especially in those in whom it is found of a dark colour, it has been observed to be preternaturally thick and tenacious. This circumstance is taken notice of not only by Hippocrates and Galen, but is very particularly described by the celebrated Boerhaave, who says, that the black bile of melancholic patients is of a thick consistence. That such bile produces mischief when once it is formed, cannot be doubted ; and as diseases of the abdominal viscera, more especially those of the stomach and liver, occasion feelings of anxiety, and the feelings of anxiety occasion dejection of mind, it will, doubtless, tend to aggravate the primary complaint. The stomach becomes disordered, the action of the intestines becomes irregular, the secretion of bile is altered, and the patient is troubled with flatulency, sympathetic

pathetic head-ach, vertigo, and many other distressing symptoms.

The faulty state of the stomach and intestines, and the neglect of food and exercise, soon cause a great change in the countenance of the patient. The whole fat is absorbed, and the face grows thin and emaciated, and its muscles weak and relaxed: the adipose support of the eye-ball is gradually diminished; and hence the sunken eye, and hollow socket. The bloom of health disappears, and the whole countenance grows pale and dejected. Together with these physiognomical *insignia* of grief, there is another which seems to strike all painters, but which is neither a constant or peculiar attendant on this passion, for it is common to many others; I mean the eye-brows being drawn together, and a little downward at the same time, as if the person frowned. This action of these parts arises whenever attention is deeply engaged with any idea; and as I have already said, is by no means peculiar to grief. It is, surely, needless to observe, that if these disorders are not corrected, the strength and health of the person must ultimately give way*.

I have known much advantage arise to people under affliction, by paying a proper attention to

* From Dr. Crichton on Mental Derangement, including the history of the passions and their effects; a work calculated equally to amuse and instruct.

their general health. Time is said by the ancients to be an indulgent deity. Until we have got accustomed to our hard lot, or, at any rate, somewhat reconciled, the torpor of the stomach and bowels, and visceral obstructions, add their own evil to the sedative effects of grief, and without health is restored, the operation of reasoning will avail but little. To accomplish this, having cleared the primæ viæ by an emetic and calomel purge, we should next throw in bark, and soon after steel and æther, with the inhalation of vital air, and the unhappy person, by this means, may probably be saved.

SECT XLI.

OF THE DIFFICULTY OF THE APPLICATION OF THE
BRUNONIAN PRINCIPLES.

A JUDICIOUS practitioner, and who prescribes according to the rules that arise from a near acquaintance with the operations of the inanimate part of matter upon living systems, will find plenty of scope for the exercise of his judgment in cases of *accumulated irritability*; and he will find that the Brunonian doctrine, as it is now filed in derision by those who know it not, is not a doctrine to be practised without knowledge, without judgment, and without sense; but that it requires every part of knowledge requisite to throw light upon so extensive a subject, and all the judgment and good sense of the soundest understanding to carry it into application upon many occasions of nicety and difficulty. The trash that has hitherto too often passed for knowledge, is to be considered not only as useless but hurtful. But the true knowledge of Nature must be always elegant, always satisfactory, always useful. It is to be hoped, says Dr. Brown, that the day is not far distant, when my doctrine will change its present appellation into that of the laws of Nature, over the living part of her productions.

SECT. XLII.

THE TWO-FOLD DIVISION OF DISEASES, INTO THE
STHENIC, AND ASTHENIC.

DR. BROWN, with a greatness of mind peculiar to himself, looked down upon disease

Quasi ex turrite altà,

as from a lofty tower, and marshalled them out into two ranks, the *sthenic*, as depending upon vigour, and *asthenic*, as shewing a weakness, or atony, of the frame.

We have before set forth the condition of health, when the state of the *irritable fibre* was that of *tone*, and the *stimuli* in *due proportion*; also the state of disease, when *these* were in an *undue balance*; and we are now arrived at the consideration of **ASTHENIC DISEASES**, when the irritable fibre is in a state of *weakness*.

ASTHENIC DISEASES.

SECT. XLIII.

OF DYSPEPSIA.

WHEN we consider the great variety of things put into the stomach, the want of moderation in regulating the quantity of our food, the warm tea drank almost immediately after a full meal, and fresh matters perpetually thrown in to be assimilated, before the former chyme has passed through the pylorus into the duodenum, our wonder is, that so delicate an organ as the stomach should not be oftener disturbed; and to this we must add, that want of exercise, and a proper oxygenation of the blood, has its share also in injuring this organ most essential to life.

The symptoms of this disease are,

1. A want of appetite, especially in the morning.
2. A frequent squeamishness.
3. Retchings, or actual vomiting.
4. Pains

4. Pains in the left side transient, or fixed at the pit of the stomach.

5. Flatulence.

6. Sleep disturbed with frightful dreams.

7. A parched tongue in the morning.

8. Drowsiness after a full meal.

9. Flushings of the cheek.

10. Coldness, especially of the feet.

11. Depression of spirits.

12. Heart-burn, and

13. Costiveness.

The want of tone in the stomach is the cause of this unpleasant train of symptoms. The gastric fluid is imperfectly secreted, and viscid flime is thrown out, which clogs the vital power.

The slowness of digestion generally produces an acid in the stomach, or wind, and this again is a cause of further inconvenience.

PRACTICAL OBSERVATIONS.

SECT. XLIV.

OF THE CURE OF DYSPEPSIA.

THE *indications* in the treatment of Dyspepsia are :

I. The *first*, and fundamental, is to give tone to the stomach.

II. The *second*, is to palliate distressing symptoms as they occur ; and,

III. The *third*, is to avoid the remote causes of this disease.

The *first indication* may be referred to two heads :

1st. *Those means which operate directly on the stomach itself.*

2d. *Those, which acting upon the whole system, impart a tonic effect to the stomach also.*

The remedies which operate directly on the stomach, are either stimulants, or tonics.

With respect to the choice of food, we would refer our readers to what is said in Vol. II. Sect. IX. of the Gastric Solvent, and the relative Digestibility of Food.

What

INTRODUCTION.

SECT. XLIII.

IN sthenic disease we were able to trace each disorder to its source, and saw that to an encreased action of the vascular system all the symptoms of disease were to be attributed. . This was as the main spring of a watch, and the symptoms were as the index pointing to its state.

Happy should we be, if asthenic diseases could be traced to some general source, and the seat of each particular disorder be clearly ascertained. The imperfect state of medicine renders such an attempt not only very difficult, but hazardous. We will, however, attempt as well as we are able the order followed in the other assemblage of sthenic diseases,

PRACTICAL OBSERVATIONS.

SECT. XLIV.

MANIA, OR WILD MADNESS*.

INSANITY, so often the offspring of epilepsy, is one of the most terrific of human maladies. It is distinguished by the following signs,

1. There is, *sometimes*, a false perception, or imagination of things present, that are not; but this is not a constant attendant upon the disease.
2. The false judgment is *generally* on subjects long before laid up in the memory.
3. It very often turns upon one single subject; but more commonly the mind rambles from one subject to another, with an equally false judgment concerning the most part of them; and ~~as~~ at the same time, there is commonly a false association, this increases the confusion of ideas, and therefore the false judgments.
4. What, for the most part, more especially distinguishes this disease, is a hurry of mind,

* From $\mu\eta\eta$, the mind.

in pursuing any thing like a train of thought, and in running from one train of thought to another.

5. Maniacal persons are, in general, very irascible; but what more particularly produces their angry emotions is, that their false judgments lead to some action which is always pushed with impetuosity and violence; when this is interrupted or restrained, they break out into violent anger and furious violence against every person near them, and upon every thing that stands in the way of their impetuous will.
6. The false judgment often turns upon a mistaken opinion of some injury supposed to have been formerly received, or now supposed to be intended: and it is remarkable, that such an opinion is often with respect to their former dearest friends and relations; and therefore their resentment and anger are particularly directed towards these.
7. And although this should not be the case, they commonly soon lose that respect and regard which they formerly had for their friends and relations.
8. With all these circumstances, it will be readily perceived, that the disease must be attended very constantly with that
X 2
incoherent

incoherent and absurd speech we call raving.

9. Further, with the circumstances mentioned, there is commonly joined an unusual force in all the voluntary motions; and an insensibility of resistance of the force of all impressions, and particularly a resistance of the powers of sleep, of cold, and even of hunger; though indeed in many instances a voracious appetite takes place.

All the species and degrees of madness which are hereditary, or which grow up with people from their early youth, are totally out of the power of physic; and so, for the most part, are all maniacal cases of more than one year's standing, let them arise from what source soever.

PRACTICAL OBSERVATIONS.

SECT. XLV.

MELANCHOLIA*; OR, SORROWFUL MADNESS.

THE melancholia we are about to consider is different from that kind which alternates with mania: for that mania which is attended with furious rage, often drops into sadness and fear, and the despondency and dejection is in exact proportion to the violence of the opposite paroxysm.

There is quite a different species of melancholia, where no furor is ever observed, and the patient fits,

1. In sullen and morose silence.
2. If loquacious, only talks of doubts and fears.
3. Whatever is presented, is imagined to be poison.
4. The head is generally reclined betwixt the knees, or nearly in that position.
5. The eye is inexpressive and heavy.
6. The countenance indicates disgust, rather than anger, when the person is disturbed.

* From *μελας* black and *χολη* bile.

7. The motion of the arms, when a change of position is made, is quick, and the same favourite posture.
8. Extreme costiveness.
9. Countenance very haggard.
10. Pulse slow and feeble.
11. Appetite often keen.
12. Emaciation.
13. A desire of suicide.

Both mania and melancholia often terminate in *amentia* idiotism *, marked by imbecility of intellect, by which the relation of things are either not perceived, or not recollected.

The accurate Morgagni has observed, that in maniacal persons the medullary portion of the brain is usually dry, hard, and firm: And this he had so frequently observed, that he was disposed to consider it as generally the case. But in most of the particular instances which he has given, it appears, that, for the most part, while the cerebrum was of an unusually hard and firm consistence, the cerebellum was of its usual softness; and in many of the cases it was unusually soft and flaccid. In some other cases, Morgagni observes, that while a part of the cerebrum was

* Meckel, in his Anatomical Observations on Scirrhus Tumours and Ulcers of the Brain, (*Histoire de l'Acad. Royale des Sciences et Belles Lettres, Année 1760. à Berlin, 1761; 4.*) mentions the case of a fatuous female, and ascribes the cause of the disease to a scirrhus gland which he found in the brain.

harder and firmer than ordinary, other parts of it were preternaturally soft.

Meckel, in his *Anatomico-physiological Researches* into the causes of the various kinds of insanity which have their seat in the body, (See *Memoires de l'Académie Royale des Sciences et Belles Lettres*, Année 1764, à Berlin, 1766,) says he has discovered, by the most careful and accurate experiments, that the specific gravity of the brain of a maniac, or melancholic patient, is very different from the specific gravity of the brain of a sane person. A cube of six lines of the brain of a healthy man, weighed one drachm and four, or at the most, six grains, (some difference, however, is observed to arise from the different distention of the blood vessels.) But in maniacs, and melancholic patients, the brain is generally harder, drier, and more elastic, and weighs specifically seven drachms. (*Memoires de l'Académie de Berlin*, tom. xx. p. 75.) In addition to this generally diseased state of brain, (namely, the increased hardness, dryness, and elasticity,) particular or local alterations may also occur; as for instance, the formation of stony matter in any part of the brain. Such diseases arise either from a congestion of lymph, or from thick blood, and great determination of it to the head; or from compression of the brain, or from pus irritating the brain, or from an irritation of the nerves called *par vagum*.

PRACTICAL OBSERVATIONS.

SECT. XLVI.

INSANIA, OR INSANITY.

THIS is a species of madness the very opposite of melancholia, it consists in

1. Erroneous judgment from perception of imagination or recollection, attended with agreeable emotions in persons of a sanguine temperament.
2. It is accompanied with great pride ; persons of this description usually conceiving they are kings and queens.
3. And hence whatever is served up to them, they imagine a princely regale.
4. The language is incoherent.
5. And the conduct not unfrequently unruly.

A mild species of this is to be found in the aberration of men of genius.

I know a man, says Bonnet, of great respectability, strict veracity, a sound understanding, and a good memory, and faculty of judging, who,

* From infania, insanity.

while quite awake, and without any external cause whatever, sees, at times, various figures of men and women, birds, chariots, buildings, &c. They appear to him to be in motion; he sees them approach towards him, recede from him, and totally disappear. Mansions rise suddenly before his eyes with all their external and appropriate decorations. At times the appearance of the paper in his room seems at once to be changed, and, instead of the usual figures which are on it, a number of fine landscapes appear to his view. Some time after, not only all the landscapes and paper, but the furniture also disappear, and the bare walls present themselves to his eyes. But I should lose myself in attempting to describe all these phenomena; my object being solely to mention them. All these objects appear to him in such perfection, and make as strong an impression on him, as real objects.—*Subtil*, p. 314. Bonnet adds, that the operation for the cataract had been successfully performed on him several years before this singular delusion commenced. At the time that Bonnet wrote the case, he says, that the left eye was almost useless, owing to the person's having greatly weakened it by too much reading, but the right one was tolerably good.

The following history is related by his biographer.

At

At Bisaccio, near Naples, Manso had an opportunity of examining the singular effects of Tasso's derangement, and often disputed with him concerning a familiar spirit, which, he pretended, conversed with him ; Manso endeavoured in vain to persuade his friend that the whole was the illusion of a disturbed imagination ; but the latter was strenuous in maintaining the reality of what he asserted, and to convince Manso, desired him to be present at one of the mysterious conversations. Manso had the complaisance to meet him next day, and while they were engaged in discourse, on a sudden he observed that Tasso kept his eyes fixed on a window, and remained, in a manner, immovable : he called him by his name, but received no answer ; at last Tasso cried out, There is the friendly spirit that is come to converse with me ; look ! and you will be convinced of the truth of all that I have said.

Manso heard him with surprize ; he looked, but saw nothing except the sun-beams darting through the window ; he cast his eyes all over the room, but could perceive nothing ; and was just going to ask where the pretended spirit was, when he heard Tasso speak with great earnestness, sometimes putting questions to the spirit, sometimes giving answers ; delivering the whole in such a pleasing manner, and in such elevated expressions, that he listened with admiration, and had not the least inclination to interrupt him. At last

last the uncommon conversation ended with the departure of the spirit, as appeared by Tasso's words, who, turning to Manfo, asked him if his doubts were removed? Manfo was more amazed than ever; he scarce knew what to think of his friend's situation, and waved any further conversation on the subject.

Infanity often terminates in mania, or melancholia. •

PRACTICAL OBSERVATIONS.

SECT. XLVII.

HYPOCHONDRIASIS, OR THE VAPOURS.

THIS disease has two varieties ;

1. An erroneous judgment, or imagination, producing some apprehension of evil, more especially respecting salvation, without a sufficient cause.
2. The same false idea respecting health, with present dissatisfaction.

This is a partial insanity of persons of a melancholic temperament. To explain which I must observe, that persons of a melancholic temperament are, for the most part, of a serious thoughtful disposition, and disposed to fear and caution, rather than to hope and temerity. Persons of this cast are less moveable than others by any impressions ; and are, therefore, capable of a closer or more continued attention to one particular object, or train of thinking. They are even ready to be engaged in a constant application to one subject ; and are remarkably tenacious of
whatever

whatever emotions they happen to be affected with.

These circumstances of the melancholic character, seem clearly to show, that persons strongly affected with it, may be readily seized with an anxious fear; and that this, when much indulged, as is natural to such persons, may easily grow into a partial insanity.

There are many cases of this kind upon record by authors. A singular one is that of Mr. Simon Browne. He was a dissenting clergyman of exemplary life, and eminent intellectual abilities; but having been seized with melancholy, he desisted from the duties of his function, and could not be persuaded to join in any act, either of public or of private worship. The reason, which, after much importunity, he assigned for this change in his conduct, was, "that he had fallen under the displeasure of God, who had caused his rational soul gradually to perish, and left him only an animal life, in common with brutes: that it was therefore profane in him to pray, and improper to be present at the prayers of others." In this opinion he remained inflexible, at the time when all the powers of his mind seemed to subsist in full vigour; when his judgment was clear, and his reasoning strong and conclusive. For at this period, he published a defence of the *Religion of Nature*, and of the *Christian Revelation* in answer to *Tindal's Christianity as old*

as the Creation: and the work is universally allowed to be the best, which that celebrated controversy produced. But in a dedication of it to queen Caroline, which some of his friends found means to suppress, he displays the very extraordinary phrensy under which he laboured. Speaking of himself, he informs her majesty, "that by the immediate hand of an avenging God, his very thinking substance has, for more than seven years, been continually wasting away, till it is wholly perished out of him, if it be not utterly come to nothing."

This remarkable and humiliating example of vigour and imbecility, rectitude and perversion of the same understanding, I have related on the authority of Dr. Hawkesworth*, who has preserved the entire copy of the dedication, from which only a brief extract is here made. Our ignorance of the history of Mr. Browne renders it impossible to trace, to its source, this mental malady. But there is reason to presume, that it originated from some strong impression, and subsequent invincible association, connected with, or perhaps producing, a change in the organization of the brain. Perhaps, having acquired an early predilection for the writings of Plato, he might afterwards, in some season of hypochondriacal dejection, fall into the gloomy mysticism of the later fol-

* See the *Adventurer*.



lowers of that amiable philosopher: for Plotinus, who flourished in the third century after the Christian æra, taught that the most perfect worship of the Deity consists, not in acts of veneration and of gratitude, but in a certain self-annihilation, or total extinction of the intellectual faculties *.

I am inclined to believe, that the celebrated Paschal laboured under a species of insanity, towards the conclusion of his life, similar to that of Mr. Simon Browne. And, having hazarded such a surmise, it is incumbent on me to shew, on what it is founded. This very extraordinary man discovered the most astonishing marks of genius in his childhood; and his progress in science was so rapid, that at the age of sixteen he wrote an excellent treatise on Conic Sections. He possessed such a capacious and retentive memory, that he is said “never to have forgotten any thing which he had learned.” And it was his practice to digest and arrange in his mind a whole series of reflections, before he committed them to writing. This power was at once so accurate and extensive, that he has been heard to deliver the entire plan of a work, of which he had taken no notes, in a continued narration, that occupied several hours. But it is related, by the editor of his *Thoughts on Religion and other Subjects* †, “that it

* See Collier's Hist. Dict. Also Maclaurin's Account of Sir Isaac Newton's Discoveries, p. 397.

† See the Preface to that Work.

pleased God so to touch his heart, as to let him perfectly understand, that the Christian religion obligeth us to live for God only, and to propose to ourselves no other object." In consequence of this persuasion, he renounced all the pursuits of knowledge, and practised the most severe and rigorous mortifications; living in the greatest penury, and refusing every indulgence, which was not absolutely necessary for the support of life. It appears from some of his pious meditations, that this resolution of mind proceeded from the visitation of sickness. And the following solemn addresses to the Deity, clearly indicate an imagination perverted by the most erroneous associations.

"O Lord, thou gavest me health to be spent in serving thee, and I applied it to an use altogether profane. Now thou hast sent sickness for my correction.—I know, O Lord, that at the instant of my death, I shall find myself entirely separated from the world, stripped naked of all things, standing alone before thee, to answer to thy justice concerning all the motions of my thoughts and spirits. Grant that I may look on myself as dead already, separated from the world, stripped of all the objects of my passion, and placed alone in thy presence.—I praise thee, O God, that thou hast been pleased to anticipate the dreadful day, by already destroying all things to my taste and thoughts, under this weakness, which

which I suffer from thy providence. I praise thee, that thou hast given me this divorce from the pleasures of the world." Was it consonant with soundness of understanding, for a man to take a sudden disgust at all the liberal studies, and innocent enjoyments, which had before engaged and gratified his mind? And was it not as much the fiction of a distempered fancy, that God enjoined poverty, abstinence, and ignorance, to one possessing rank, fortune, and the noblest endowments of the mind, as the belief of Simon Browne, that he was divested of that rationality, which, at the same time, he so eminently displayed? Whenever false ideas, of a practical kind, are so firmly united, as to be constantly and invariably mistaken for truths, we very justly denominate this unnatural alliance, insanity. And, if it give rise to a train of subordinate wrong associations, producing incongruity of behaviour, incapacity for the common duties of life, or unconscious deviations from morality and religion, madness has then its commencement.

We come now to consider the second variety, which is often confounded with dyspepsia. It is marked by

1. A ~~very~~ particular attention to health.
2. To every, even the slightest feelings of the body.
3. And from any unusual feeling, even of the

slightest kind, they apprehend great danger, and even death itself.

4. In respect to all these feelings and apprehensions, there is the most obstinate belief and persuasion, which cannot be shaken either by reasoning or ridicule.

The combination of vapours with dyspepsia is very frequent, and in seemingly very different circumstances. It is, especially, these different circumstances that I would wish to ascertain; and I remark that they are manifestly of two different kinds. First, as the disease occurs in young persons of both sexes, in persons of a sanguine temperament, and of a lax and flaccid habit. Secondly, as it occurs in elderly persons of both sexes, of a melancholic temperament, and of a firm and rigid habit.

These two different cases of the combination of vapours and dyspepsia, I consider as two distinct diseases, to be distinguished chiefly by the temperament prevailing in the persons affected.

As the dyspepsia of sanguine temperaments is often without vapours; and, as the vapours, when joined with dyspepsia in such temperaments, may be considered as, perhaps, always a symptom of the affection of the stomach; so to this combination of dyspepsia and vapours, I would still apply the appellation of dyspepsia, and consider it as strictly a disease, which will be treated of presently.

But

But the combination of dyspepsia and vapours in melancholic temperaments, as the vapours or the turn of mind peculiar to the melancholic temperament, are essential circumstances of the disease; and, as this turn of mind is often with few, or only slight symptoms of dyspepsia; and, even though the latter be attending, as they seem to be rather the effects of the general temperament, than of any primary or topical affection of the stomach; I consider this combination as a very different disease from the former, and would apply to it strictly the appellation of Hypochondriasis.

Having thus pointed out a distinction between Dyspepsia and Hypochondriasis, I shall now, using these terms in the strict sense above-mentioned, make some observations which may, I think, illustrate the subject, and more clearly and fully establish the distinction proposed.

The dyspepsia often appears early in life, and is frequently much mended as life advances: but the hypochondriasis seldom appears early in life, and more usually in more advanced years only; and more certainly still, when it has once taken place, it goes on increasing as life advances to old age.

This seems to be particularly well illustrated, by our observing the changes in the state of the mind which usually take place in the course of life.

life. In youth, the mind is cheerful, active, rash, and moveable: but, as life advances, the mind, by degrees, becomes more serious, slow, cautious, and steady; till at length, in old age, the gloomy, timid, distrustful, and obstinate state of melancholic temperaments is more exquisitely formed. In producing these changes, it is true, that moral causes have a share; but it is at the same time obvious, that the temperament of the body determines the operation of these moral causes, sooner or later, and in a greater or lesser degree, to have their effects. The sanguine temperament retains longer the character of youth, while the melancholic temperament brings on more early the manners of old age.

Upon the whole, it appears, that the state of the mind which attends, and especially distinguishes, hypochondriasis, is the effect of that same rigidity of the solids, torpor of the nervous power, and peculiar balance between the arterial and venous systems which occur in advanced life, and which at all times take place more or less in melancholic temperaments. If, therefore, there be also somewhat of a like state of mind attending the dyspepsia which occurs early in life in sanguine temperaments and lax habits, it must depend upon a different state of the body, and probably upon a weak and moveable state of the nervous power.

Agreeable

Agreeable to all this in dyspepsia, there is more of spasmodic affection, and the despondency of the mind is often absent, and, when present, is, perhaps, always of a slighter kind; while in hypochondriasis the affection of the mind is more constant, and the symptoms of dyspepsia, or the affections of the stomach, are often absent, or when present, are in a slighter degree.

I believe the affection of the mind is commonly different in the two diseases. In dyspepsia, it is often languor and timidity only, easily dispelled; while in hypochondriasis, it is generally the gloomy and riveted apprehension of evil.

The two diseases are also distinguished by some other circumstances. Dyspepsia, as I have said, is often a symptomatic affection; while hypochondriasis is, perhaps, always a primary and idiopathic disease.

As debility may be induced by many different causes, dyspepsia is a frequent disease; while hypochondriasis, depending upon a particular temperament, is more rare.

It is now proper to consider in what this melancholic temperament especially consists; and to this purpose, it may be observed, that in it there is a degree of torpor in the motion of the nervous power, both with respect to sensation and volition; and there is a general rigidity of the simple solids; and that the balance of the sanguiferous system is upon the side of the veins. But all these

circumstances are the directly opposite of those of the sanguine temperament ; and must, therefore, also produce an opposite state of mind.

It is this state of mind, and the state of the brain corresponding to it, that is the chief object of our present consideration. But what that state of the brain is, will be supposed difficult to explain ; and it may, perhaps, seem rash in me to attempt it.

I will, however, venture to say, that it is probable the melancholic temperament of mind depends upon a drier and firmer texture in the medullary substance of the brain ; and that this perhaps proceeds from a certain want of fluid in that substance, which appears from its being of a lesser specific gravity than usual. That this state of the brain in melancholia does actually exist, I conclude, first, from the general rigidity of the whole habit ; and, secondly from dissections, showing such a state of the brain to have taken place in mania, which is often no other than a higher degree of melancholia. It does not appear to me anywise difficult to suppose, that the same state of the brain may, in a moderate degree, give melancholia ; and in a higher, that mania which melancholia so often passes into ; especially, if I shall be allowed further to suppose, that either a greater degree of firmness in the substance of the brain may render it susceptible of a higher degree of ex-

excitement, or that one portion of the brain may be liable to acquire a greater firmness than others, and consequently give occasion to that inequality of excitement which so much characterises the present disease.

PRACTICAL OBSERVATIONS.

SECT. XLVIII.

APOPLÉXIA* AND PÁRALYSIS†, OR PALSY.

APOPLEXY, in all its different degrees, most commonly affects persons advanced in life, and especially those above sixty years of age. It most usually affects persons of large heads and short necks, persons of a corpulent habit, persons who have passed an indolent life and used a full diet, and especially those who have indulged in frequent intoxication. Men, who have long laboured under a frequent and copious discharge of blood from the hemorrhoidal vessels, upon either the suppression or spontaneous ceasing of that discharge, are particularly liable to be affected with apoplexy.

This disease frequently comes on very suddenly: but in many cases it is preceded by various symptoms, such as,

1. Frequent fits of giddiness.
2. Frequent head-achs.

* From *ερε* and *αναω*, to strike down.

† From *παρωω*, to loose.

3. Some

3. Some transitory interruption of seeing and hearing.
4. False vision and sometimes hearing.
5. A sense of numbness and tingling in the extremities.
6. Shedding of tears without a sufficient assignable cause.
7. Some faltering in the tongue.
8. Frequent drowsiness.
9. Loss of memory.
10. Faculties impaired.
11. Lowness of spirits.

An attention to these symptoms, and to the predisponent circumstances, will often enable us to foresee and hinder the more violent attacks of this disease.

When the disease comes on suddenly to a considerable degree, it has been frequently observed to have been immediately induced by violent exercise; by a full and long-continued inspiration; by a fit of anger; by much external heat, especially that arising from a crowded assembly of people; by warm bathing; by intoxication; by long stooping with the head down; and by a tight ligature about the neck. The disease has been remarked to make its attacks most frequently in the spring season, and especially when the vernal heat suddenly succeeds to the winter cold. In short, it is produced by whatever determines the blood to the head.

The

The fit itself is marked by the following symptoms;

1. There is a sudden privation of all the powers of sense and voluntary motion, often without any indication of its approach.
2. The patient falls down.
3. The mouth is usually drawn on one side.
4. The joints remain flexible, and
5. The muscles remain flaccid.
6. The person is seemingly in a profound sleep.
7. Often it is accompanied with stertor, or sonorous breathing, or loud snoring.

Dissections of subjects who die of this disease, for the most part, shew, that the brain has been oppressed, and this may be produced in different ways, as

1. By external violence fracturing and pressing in a part of the cranium.
2. By tumours, sometimes soft, sometimes bony, formed in different parts of the brain, or in its membranes, and becoming of such a bulk as to compress the medullary substance of the brain.
3. By the blood accumulated in the blood-vessels of the brain, and distending them to such a degree as to compress the medullary portion of the same.
4. By fluids effused in different parts of the brain,

brain, or into the cavity of the cranium, and accumulated in such quantity as to occasion the compression we treat of.

And, as to this last, it is to be remarked here, that the fluids effused may be of two kinds: that is, they may be either a portion of the common mass of blood, poured out from red vessels; or a portion of serum or colourless fluid, poured out chiefly by exhalents.

This produces the distinction of two kinds in medical writings.

I. The *apoplexia sanguinea*,

1. Which is supposed to attack more suddenly than the *serosa*, being
2. Without much previous oppression,
3. Or unusual sleepiness.
4. The face appears red and flushed.
5. The veins turgid.
6. The eyes half open, but not transparent.
7. The respiration tolerably free,
8. Though accompanied with snoring, or rattling in the throat.
9. The pulse full and strong.

II. The *apoplexia serosa*

1. Is apt to be preceded by an unusual heaviness,
2. Giddiness, and
3. Drowsiness.

And after the stroke

4. The face is not remarkably red nor flushed,
5. The

5. The veins are not turgid,
6. The respiration is more straitened,
7. And there is more of the rattling and snoring,
8. With a working of froth from the mouth.
9. The pulse is not strong, nor remarkably full, and inclines to intermit.

There have been instances where an apoplectic fit has wrought itself off by an effort of nature; and where a profuse spitting, a bleeding at the nose, or a plentiful diarrhœa, have saved life: but, in general, the patients depend on art for their preservation.

If the patient can be brought to himself within the first four days, there may be hopes of a complete recovery, and we are to settle a proper scheme of conduct for the prevention of future attacks; but if there be no remarkable amendment within the time above-mentioned, there is but little hope of shaking off the disease, which will either destroy life immediately, or terminate in an incurable palsy, for the most part.

Palsy is a disease consisting in a loss of the power of voluntary motion, but affecting certain parts of the body only, and by this it is distinguished from apoplexy. One of the most frequent forms of palsy is, when it affects the whole of the muscles on one side of the body; and then the disease is named a *Hemiplegia*.

In the most violent degrees of palsy, the patient

ent loses both the power of motion and sense of feeling, either of one side, or of the lower half of the body. The first case is termed *Hemiplegia* *, the latter *Paraplegia* †.

The most common species is the hemiplegia; and this is usually the consequence of an apoplectic stroke. It is not uncommon to see patients live for several years in the paralytic state, especially if it be the hemiplegia: and even in the paraplegia, if death does not ensue within the first two or three weeks, it may not take place for a considerable time.

The hemiplegia usually begins with, or follows, a paroxysm of apoplexy; and when the hemiplegia, after subsisting for some time, becomes fatal, it is commonly by passing again into the state of apoplexy. The relation, therefore, or affinity between the two diseases, is sufficiently evident; and is further strongly confirmed by this, that the hemiplegia comes upon persons of the same constitution, and is preceded by the same symptoms that have been taken notice of with respect to apoplexy.

It is a promising circumstance in paralytic cases, when the patient feels a light degree of painful itchiness in the affected parts; and if a fever should arise, it bids fair to remove the palsy.

When the sense of feeling remains, there is

* From *ημιον* half, and *πλησσω*, to strike.

† From *παρά*, across, and *πλησσω*, to strike.

much more room to hope for a perfect recovery, than in cases where the powers both of motion and sensation are lost; but when we observe the flesh to waste, and the skin to appear withered and dry, we may look on the disease as quite incurable. The palsy sometimes ends in a mortification; and convulsions, for the most part, coming on before death, puts an end to the misery of the patient.

The *carus* is a most profound and quiet sleep, protracted beyond the natural and healthy period, from which the patient cannot be roused.

The *lethargy* is an imperfect apoplexy, or *carus*; wherein the patient may be roused, but immediately falls asleep again.

There is no great necessity for making more distinctions of the palsy than those above-mentioned; if the reader is desirous of seeing more, he may consult Sauvage.

PRACTICAL OBSERVATIONS.

SECT. XLIX.

EPILÉPSIA * ; OR, EPILEPSY.

THE *Epilepsy* differs from a convulsion, in its being accompanied with total insensibility ; in its returning periodically, though not always at regular intervals ; and in its being a chronic disease, that often lasts for a number of years without destroying life.

The general form or principal circumstances of this disease, are much the same in all the different persons whom it affects. It comes by fits, which often attack persons seemingly in perfect health ; and, after lasting for some time, pass off, and leave the persons again in their usual state. These fits are sometimes preceded by certain symptoms, which, to persons who have before experienced such a fit, may give notice of its approach, as we shall hereafter explain ; but even these preludes do not commonly occur long before the formal attack, which in most cases comes on suddenly without any such warning.

* From *επιλειψις* a swoon.

Persons afflicted with the Epilepsy

1. Fall down suddenly, deprived of all sense, like those who are struck with an apoplexy, but they do not, like these, lie quiet, as if in a profound sleep. On the contrary,
2. The whole muscular system is agitated by such violent convulsive motion, that it is scarcely possible for the bye-standers to keep the persons afflicted from hurting themselves.
3. Commonly the limbs on one side of the body are more violently or more considerably agitated than those of the other.
4. In all cases, the muscles of the face and eyes are much affected, exhibiting various and violent distortions of the countenance.
5. The tongue is often thrust out of the mouth, while the muscles of the face and eyes are much affected, exhibiting various and violent distortions of the countenance.
6. And from the action of the muscles of the lower jaw, the tongue is often grievously bit.
7. Generally, after no long time, the convulsions of the limbs, trunk of the body, and face, cease, when the person remains without motion, insensible, and as if asleep.

The total loss of sense, and the froth that issues from the mouth during the convulsions, are
what

what distinguishes the true epilepsy; and, by attending to this circumstance, we may always be able to know whether the disease be counterfeited; which impostors in military hospitals, and vagabonds, to extort charity, are often found to do: these may be detected, by applying somewhat extremely stimulating to the nostrils, such as the strongest spirit of sal ammoniac; or by slightly puncturing some very sensible part.

It is generally supposed, that the change and full of the moon have some influence in bringing on the fits: this, however, is much to be doubted; but it is certain, that excesses of every kind, whether in respect of diet, exercise, or the passions of the mind, are extremely apt to accelerate the return of the paroxysm.

Few diseases are more capable of being transmitted from parents to their offspring than the epilepsy; it has also been known to take its rise from severe frights during the earlier periods of life. Dr. Locker, physician to the hospital of St. Mark at Vienna, relates, that out of fourteen epileptic patients in that house, he found there were six of them wherein the disease had ensued from frights; one case, wherein it appeared to be the consequence of a blow on the head; another, where it arose from a sudden stoppage of the courses; but in the remaining six, the source could not be traced to any external cause.

If an epilepsy, which has begun during childhood, does not go off upon the changes that happen in the constitutions of both sexes about the age of puberty, we may consider it as likely to endure for the remainder of life.

The dissection of epileptic subjects has shewn a variety of morbid appearances, which may be supposed to have contributed to the disease; such as, indurations in the brain or meninges; caries of the internal surface of the cranium; projections of the bony substance of the cranium, pressing upon the brain; collections of serum, or purulent matter, and earthy concretions within the skull, besides many others which are recorded by Bonetus, Morgagni, and Lieutaud.

PRACTICAL OBSERVATIONS.

SECT. L.

CATALÉPSIA, OR CATALEPSY*.

OF all the nervous or spasmodic disorders, there is none more surprising than catalepsy. In this the patient becomes,

1. Wholly insensible of every thing passing;
and,
2. Remains exactly in the same posture in which he was first seized.
3. His joints are so stiff, that they can scarcely be bent, or, if they are, they remain in every situation they are placed.
4. The pulse is slow and irregular.

A very surprising case of this disorder is given by the learned Dr. John Jebb : it is as follows,

In the latter end of the last year, I was desired to visit a young lady, who, for nine months, had been afflicted with that singular disorder, termed a catalepsy. Although she was prepared for my visit, she was seized with the disorder as soon as my arrival was announced. She was employed in netting, and was passing the needle through the

* From *κατάληψις*, a seizure.

ness ; in which position she immediately became rigid, exhibiting, in a very pleasing form, a figure of death-like sleep, beyond the power of art to imitate, or the imagination to conceive. Her forehead was serene, her features perfectly composed. The paleness of her colour, her breathing at a distance being also scarce perceptible, operated in rendering the similitude to marble more exact and striking. The position of her fingers, hands, and arms, was altered with difficulty ; but they preserved every form of flexure they acquired : nor were the muscles of the neck exempted from this law ; her head maintaining every situation, in which the hand could place it, as firmly as her limbs.

Upon gently raising the eyelids, they immediately closed, with a degree of spasm. The iris contracted upon the approach of a candle, as in a state of vigilance ; the eye-ball itself was slightly agitated with a tremulous motion, not discernible when the eyelid had descended.

About half an hour after my arrival, the rigidity in her limbs and statue-like appearance being yet unaltered, she sung three plaintive songs, in a tone of voice so elegantly expressive, and with such affecting modulation, as evidently pointed out, how much the most powerful passion of the mind was concerned in the production of her disorder, as indeed her history confirmed. In a few minutes afterwards she sighed deeply, and the spasm
in

in her limbs was immediately relaxed. She complained that she could not open her eyes, her hands grew cold, a general tremor followed ; but, in a few seconds, recovering entirely her recollection and powers of motion, she entered into a detail of her symptoms, and the history of her complaints.

She informed me, that she had no recollection whatever of what passed in the fits ; that upon coming out of them she felt fatigue, in proportion to the time of their continuance ; and, that they sometimes lasted for five hours, though generally for a much shorter period.

She further related, that the fits returned once or twice a day, sometimes more frequently ; but that she never was troubled with them in the night. She sometimes lost her sight and speech, the power over her limbs, and her intellectual faculties remained unimpaired. The fits frequently attacked her without any previous warning : at other times, a fluttering at her stomach, and a fixed pain at the top of her head, occupying a part which she could cover with her finger, announced their approach.

Hysterical risings in her throat, appearances of fire, pains in her eyes, and not unfrequently in her teeth, flatulence, a sense of weight in her stomach after eating, with convulsive motions in the region of that organ, were superadded symptoms, of which she much complained.

Her

Her disorder was evidently exasperated at the approach of the catamenia, which were constantly present at the regular period. She was always much agitated previously to a storm of thunder; and every material alteration of the weather produced a sensible effect.

After she had discoursed for some time with apparent calmness, the universal spasm suddenly returned. Her features now assumed a different form, denoting a mind strongly impressed with anxiety and apprehension. At times she uttered short and vehement exclamations, in a piercing tone of voice, expressive of the passions that agitated her mind; her hands being strongly locked in each other, and all her muscles, those subservient to speech excepted, being affected with the same rigidity as before.

During the time of my attendance, similar appearances were frequently exhibited.

I was informed, by the family, of many particularities in the access of the disorder, all denoting its instantaneous effect upon the nervous system. She once was seized in my presence while drinking tea, and became universally rigid, at the instant she was bringing the tea-cup to her mouth. Her tears sometimes flowed copiously, while every internal, as well as external sense, seemed intirely locked up in sleep.

The existence of this disease has been often denied.

nied. But the author of this work, himself, saw a case of catalepsy in St. Thomas's Hospital.

The patient was a young woman, daughter of a tradesman, who was alarmed in the middle of the night with the general cry of fire, and found herself surrounded with the flames. Having had the courage, after the first horrid fright, to hurry on a few of her clothes; she was but little scorched. On every side she heard

"Speed the quick step, nor turn the ling'ring eye!"

Onward she moves—loud horror roars behind,

And shrieks of anguish bellow in the wind;

With many a sob, amid a thousand fears,

The beauteous wand'rer pours her gushing
tears;

She flies, she stops, she pants, she looks behind,

And hears a demon howl in ev'ry wind.

As the bleak blast unfurls her flutt'ring vest,

Cold beats the snow upon her shudd'ring
breast;

Through her numb'd limbs the chill sensa-
tions dart,

And the keen ice-bolt trembles at her heart—

"I sink, I fall—oh! help me, help!" she cries,

Her stiff'ning tongue th' unfinish'd sound de-
nies;

Tear after tear, a-down her cheeks succeeds,

And pearls of ice bestrew the glitt'ring meads;

Congeeing

Congealing snows her ling'ring feet surround,
 Arrest her flight, and root her to the ground;
 With suppliant arms she pours the silent pray'r,
 Her suppliant arms hung crystal in the air;
 Pellucid films her shiv'ring neck o'erspread,
 Seal her mute lips, and silver o'er her head;
 Veil her pale bosom, glaze her lifted hands,
 And shrin'd in ice the beauteous *statue* stands.

DARWIN.

The patient, after experiencing three or four of the same fits, was brought to St. Thomas's Hospital. Here it was agreed, among twelve of the students, to watch the approach of these extraordinary fits in turn, and then to communicate the information to the others.

As she was sitting one evening, about nine o'clock, on a bench in the hospital, seemingly well, she was suddenly attacked, and stiffened in that posture. She was put immediately to bed by the nurse, and her legs were straightened. She lay not, however, as a corpse, but as one enchanted. Her breathing was so soft as only to be perceptible to a glass; every feature was placid, and there was a peculiar glow over her whole countenance, which was extremely fair. Her eyes, which were large, and of a soft blue, were wide open*, and shone very bright. The same still stiffness continuing for a length of time,

* In this, the case differed materially from Dr. Jebb's.

infused

infused an indescribable sensation. In whatever position we put the arms, they remained the same. The fingers when pointed, continued so; and when clasped, rested rigidly firm. She was wholly insensible to the loudest noise. In dropping some hartshorn near the nostril, the hand of the student failed him, and more than was intended fell into that part. There was immediately a movement of the head, expressive of pain, with a motion of a muscle of the face, on that side; several large tears dropt from the eyes, but so rigid were the eyelids, that they were not closed, but continued still wide open. After remaining in this state above an hour, she fetched a deep breath, sighed several times, looked with some surprize around her, drooped her head, felt languid, was given something to drink, and recovered, insensible of what had passed, only she perceived her nostril stung, and it gave her pain.

Catalepsy, if not cured, ends either in mania, or apoplexy.

PRACTICAL OBSERVATIONS.

SECT. LI.

TÉTANUS*, OR LOCKED JAW.

1. This disease sometimes comes on suddenly to a violent degree, but more generally it approaches by slow degrees to its violent state.
2. In this case it attacks with a sense of stiffness in the back-part of the neck, which, gradually increasing, renders the motion of the head difficult and painful.
3. As the rigidity of the neck comes on and increases, there is commonly at the same time a sense of uneasiness felt about the root of the tongue; which, by degrees, creates a difficulty of swallowing, and at length an entire interruption of it.
4. While the rigidity of the neck goes on increasing, there arises a pain, often violent, at the lower end of the sternum, and from thence shooting into the back.
5. When this pain arises, all the muscles of the neck, and particularly those of the

* From *τριζω*, to gnash,

back part of it, are immediately affected with spasm, pulling the head strongly backwards.

6. At the same time, the muscles that pull up the lower jaw, which upon the first approaches of the disease were affected with some spastic rigidity, are now generally affected with more violent spasm, and set the teeth so closely together, that they do not admit of the smallest opening. This is what has been named the *Locked Jaw*, and is often the principal part of the disease.
7. When the disease has advanced thus far, the pain at the bottom of the sternum returns very frequently, and with it the spasms of the hind-neck and lower-jaw are renewed with violence and much pain.
8. As the disease thus proceeds, a greater number of muscles come to be affected with spasms.
9. After those of the neck, those along the whole of the spine become affected, bending the trunk of the body strongly backwards; and this is what has been named the *Opisthótonos*.
10. In the lower extremities, both the flexor and extensor muscles are commonly at the same time affected, and keep the limbs rigidly extended.
11. Though

11. Though the extensors of the head and back are usually the most strongly affected, yet the flexors, or those muscles of the neck that pull the head forward, and the muscles that should pull down the lower jaw, are often at the same time strongly affected with spasm.
12. During the whole of the disease, the abdominal muscles are violently affected with spasm, so that the belly is strongly retracted, and feels hard as a piece of board.
13. At length the flexors of the head and trunk become so strongly affected as to balance the extensors, and to keep the head and trunk straight, and rigidly extended, incapable of being moved in any way; and it is to this state the term of *Tétanus* has been strictly applied.
14. At the same time, the arms, little affected before, are now rigidly extended; the whole of the muscles belonging to them being affected with spasms, except those that move the fingers, which often to the last retain some mobility.
15. The tongue also long retains its mobility; but at length it also becomes affected with spasms, which, attacking certain of its muscles only, often thrust it violently out between the teeth.

16. At

16. At the height of the disease, every organ of voluntary motion seems to be affected ; and amongst the rest, the muscles of the face.
 17. The forehead is drawn up into furrows, the eyes, sometimes distorted, are commonly rigid, and immoveable in their sockets ; the nose is drawn up, and the cheeks are drawn backwards towards the ears, so that the whole countenance expresses the most violent grinning.
 18. After these universal spasms, a violent convulsion commonly comes on, and puts an end to poor tortured being.
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SECT. LII.

SOMNAMBULISMUS, OR WALKING IN ONE'S SLEEP.

THE patient,

1. Has his eyes wide open, but sees nothing.
2. He exercises his mind with recollection.
3. His walks are to some particular spot, which when done, he appears composed, and sleeps quiet the remainder of the night.

PRACTICAL OBSERVATIONS.

SECT. LIIL.

RELAXATIO UVULÆ, OR RELAXATION OF THE UVULA.

In the order we proceed now to the *throat*,
and are to consider,

1. The falling down, or elongation of the
uvula.
2. A sense of tickling in the fauces.
3. And soreness at the root of the tongue.

Pulling up a middle lock in the head, so as to
raise the scalp, elevates the uvula by a motion
this creates in the mouth, and without examina-
tion proves the disease.

SECT. LIV.

RAUCÉDO, OR HOARSENESS.

It is generally symptomatic of cold, and often
comes on towards evening in consumptions, some-
times it is an idiopathic disease, and continues
extremely obstinate.

PRACTICAL OBSERVATIONS.

SECT. LV.

GLOBUS HYSTÉRICUS, OR HYSTERIC BALL.

THIS is symptomatic of the disease called hysteria, and consists in a spasm occupying the two extremities of the œsophagus, embracing in the middle a quantity of air, which can neither be expelled backwards or forwards, and gives the unpleasant sensation of immediate suffocation.

SECT. LVI.

WE descend now to the contents of the thorax, and proceed in order to the diseases affecting that part, and first we will consider,

HÆMOPTYSIS †, OR SPITTING OF BLOOD.

The blood-vessels of the lungs are more numerous than those of any other part of the body of the same bulk. These vessels, of the largest size, as they arise from the heart, are more immediately than in any other part subdivided into

* From αἷμα, blood, and πῆσιν, to spit.

vessels of the smallest size; and these small vessels spread out near to the internal surfaces of the bronchial cavities, are situated in a loose cellular texture, and covered by a tender membrane only: so that, considering how readily and frequently these vessels are gorged with blood, we may understand why an hemorrhagy from them is, next to that of the nose, the most frequent of any.

1. This disease usually comes on with a sense of weight and anxiety in the chest, some uneasiness in breathing, some pain of the breast or other parts of the thorax, and some sense of heat under the sternum; and very often, before the disease appears, a saltish taste is perceived in the mouth.
2. Immediately before the appearance of blood, a degree of irritation is felt at the top of the larynx.
3. To relieve this, a hawking is made, which brings up a little blood, of a florid colour, and somewhat frothy.
4. The irritation returns; and, in the same manner, more blood of a like kind is brought up, with some noise in the wind-pipe, as of air passing through a fluid.

This is commonly the manner in which the hemoptysis begins; but sometimes at the very first the blood comes up by coughing, or at least some-

somewhat of coughing accompanies the hawking just now mentioned.

The blood issuing is sometimes at first in very small quantity, and soon disappears altogether: but, in other cases, especially when it repeatedly occurs, it is in greater quantity, and frequently continues to appear at times for several days together. It is sometimes profuse; but rarely in such quantity as either by its excess, or by its sudden suffocation, to prove immediately mortal. It commonly either ceases spontaneously, or is stopped by the remedies employed.

When blood is thrown out from the mouth, it is not always easy to determine from what internal part it proceeds; whether from the internal surface of the mouth itself, from the fauces, or adjoining cavities of the nose, from the stomach, or from the lungs. It is, however, very necessary to distinguish the different cases; and, in most instances, it may be done by attending to the following considerations.

When the blood spit out, proceeds from some part of the internal surface of the mouth itself, it comes out without any hawking or coughing, and generally upon inspection, the particular source of it becomes evident.

When blood proceeds from the fauces, or adjoining cavities of the nose, it may be brought out by hawking, and sometimes by coughing, in

the manner we have described ; so that, in this way, a doubt may arise concerning its real source. A patient often lays hold of these circumstances to please himself with the opinion of its coming from the fauces, and he may be allowed to do so ; but a physician cannot readily be deceived, if he consider, that a bleeding from the fauces is more rare than one from the lungs ; that the former seldom happens but to persons who have been before liable either to an hemorrhagy of the nose, or to some evident cause of erosion ; and, in most cases, by looking into the fauces, the distillation of the blood, if it comes from thence, will be perceived.

When blood proceeds from the lungs, the manner in which it is brought up will commonly show from whence it comes : but, independent of that, there are many circumstances which may concur to point it out, such as the period of life, the habit of body, and other marks of a predisposition ; and, together with these, the occasional causes having been immediately before applied.

When vomiting accompanies the throwing out of blood from the mouth, as vomiting and coughing often mutually excite each other ; so they may be frequently joined, and render it doubtful, whether the blood thrown out proceeds from the lungs or from the stomach. We may however generally decide, by considering, that blood
does

does not so frequently proceed from the stomach as from the lungs: that blood proceeding from the stomach commonly appears in greater quantity, than when it proceeds from the lungs: that the blood proceeding from the lungs is usually of a florid colour, and mixed with a little frothy mucus only; whereas the blood from the stomach is commonly of a darker colour, more grumous, and mixed with the other contents of the stomach: that the coughing or vomiting, according as the one or the other first arises in the cases in which they are afterwards joined, may sometimes point out the source of the blood; and, lastly, that much may be learned from the circumstances and symptoms which have preceded the hemorrhagy.

Those which precede the hemoptysis, are most of them evident marks of an affection of the lungs. And, on the other hand, the hematemesis, or issuing of blood from the stomach, has also its peculiar symptoms and circumstances preceding it; as, for instance, some morbid affection of this organ, or at least some pain, anxiety, and sense of weight, referred distinctly to the region of the stomach. To all this may be added, that the vomiting of blood happens more frequently to females than to males; and to the former, in consequence of a suppression of their menstrual period: and by attending to all these considerations,

the presence of the hæmoptysis may, I think, be sufficiently ascertained.

That this disorder is mostly, if not always, asthenic, only consider whom it affects; consider also the exciting noxious powers, and the symptoms. During the whole period of the predisposition the patients are delicate and weakly; they have very little appetite, and what food they take is ill digested, and often rejected by vomiting. In this weak state they are not supported by the stimulant operation of corporeal, or mental exercise; nor by that of high spirits, for they are quite dejected; nor by that of pure air, which they are not able to go out to take; nor by that of agreeable sensation; nor by that of strong liquors, which from the wrong advice of their physicians, they look upon as poison; nor by that of the distention of the vessels, for these are not sufficiently filled with blood.--

This disorder if not followed by a speedy termination, usually brings on a cough, ending in a true phthisis pulmonalis, one of the most insidious and fatal of our diseases, which we are next to consider.

SECT. LVII.

PHTHISIS PULMONALIS, OR PULMONARY
CONSUMPTION

THIS disease, as appears from dissection, generally arises from suppurating tubercles.

Tubercles, says the late Dr. Stark, are found, on dissection of those who have died of this disease, of all sizes, from the smallest granules to the bigness of a horse bean, and commonly in clusters. On cutting into them, they appear of a white, smooth, cartilaginous substance. In the smallest, no cavity or opening appears; in those farther advanced, on the cut surface we discover small pin holes; in those still larger are one or more cavities containing a fluid like pus; which being cleared off, in the bottom is perceived several small openings or holes; through which, on pressing the tubercle, matter issued, similar to that contained in its cavity. The larger tubercles, when emptied of their contents, appear like a small capsula, into which entered a branch of the wind-pipe.

This disease, when arising from tubercles,

1. Usually commences with a slight and short cough, which becomes habitual, is often

From *φθω*, to consume.

little

little remarked by those affected, and sometimes so little as to be absolutely denied by them.

At the same time their breathing becomes greatly hurried by any bodily motion, their body grows leaner, and they become languid and indolent.

This state sometimes continues for a year, or even for two years, without the persons taking any complaint of it, excepting only that they are affected by cold more readily than usual, which frequently increases their cough, and produces some catarrh. This, again, however, is sometimes relieved; is supposed to have arisen from cold alone; and therefore gives no alarm either to the patient or to his friends, nor leads them to take any precautions.

Upon one or other of these occasions of catching cold, as we commonly speak, the cough becomes more considerable; is particularly troublesome upon the patient's lying down at night, and in this state continues longer than is usual in the case of a simple catarrh. This, more especially, should call for attention, if the increase and continuance of cough come on during the summer season.

The cough, which comes on as has been
just

just now described, is very often for a long time without any expectoration; but when, from repeatedly catching cold, it becomes more constant, it is then at the same time attended with some expectoration, which is most so tolerable in the mornings.

6. The matter of this expectoration becomes by degrees more copious, more viscid, and more opaque; at length of a yellow or greenish colour, and of a pultaceous appearance.*

The

* It has sometimes happened, that a catarrhus of the lungs, with an expectoration of a matter so much resembling pus, that physicians have been often uncertain whether it was mucus or pus, and therefore whether the disease was a catarrh or a phthisis. It is often of consequence to determine these questions; and it appears to me that it may be generally done, with sufficient certainty, from the following considerations, of which each particular is not always singly decisive, but when they are taken together, can hardly deceive us.

1. From the colour of the matter; as mucus is naturally transparent, and pus always opaque. When mucus becomes opaque, as it sometimes does, it becomes white, yellow, or greenish; but the last-mentioned colour is hardly ever so remarkable in mucus as in pus.

2. From the consistence; as mucus is more viscid, and coherent, and pus less so, and may be said to be more fluid. When mucus is thrown into water, it is not readily diffused, but remains united in uniform and circular masses: but pus in the same circumstances, though not readily diffused, does not remain so uniformly united, and by a little agitation is broken into ragged fragments.

3. From the odour, which is seldom perceived in mucus, but frequently in pus. It has been proposed to try the odour

of

7. The whole of the matter, however, is not always at once entirely changed in this manner; but, while one part of it retains the usual form of mucus, another suffers the changes now described.
8. When the cough increases, and continues very frequent through the night, and when the matter expectorated undergoes the changes I have mentioned, the breathing at the same time becomes more difficult, and the emaciation and weakness go on also increasing.

9. In

of the matter expectorated, by throwing it upon live coals: but in such a trial both mucus and pus give out a disagreeable smell, and it is not easy to distinguish between them.

4. From the specific gravity compared with water: and, indeed, it is usual for the mucus of the lungs to swim on the surface of water, and for pus to sink in it. But in this we may sometimes be deceived; as pus which has entangled a great deal of air, may swim, and mucus that is free from air, may sink.

5. From the mixture which is discernible in the matter brought up: for if a yellow or greenish matter appears surrounded with a quantity of transparent or less opake and less coloured matter, the more strongly coloured matter may be generally considered as pus; as it is not easy to understand how one portion of the mucus of the lungs can be very considerably changed, while the rest of it is very little so, or remains in its ordinary state.

6. From the admixture of certain substances with the matter thrown out from the lungs. To this purpose we are informed by the experiments of the late very ingenious Mr. Charles Blount: *a.* That the vitriolic acid dissolves both mucus and pus, but most readily the former: That, if water be added to such a solution of mucus, this is separated, and either swims

9. In the female sex, as the disease advances, and sometimes early in its progress, the menses cease to flow; and this circumstance is to be considered as commonly the effect, although the sex themselves are ready to believe it the sole cause, of the disease.

10. When the cough comes, as before described, the pulse is often natural, and for some time after continues to be so; but the symptoms have seldom subsisted long before the pulse becomes frequent, and sometimes to a considerable degree, without much of the other symptoms of fever.

on the surface, or, divided into flocculi, is suspended in the liquor; whereas, when water is added to a like solution of pus, this falls to the bottom, or by agitation is diffused so as to exhibit an uniformly turbid liquor. *b.* That a solution of the caustic fixed alkali, after some time, dissolves mucus, and generally pus; and, if water be added to such solutions, the pus is precipitated, but the mucus is not. From such experiments it is supposed, that pus and mucus may be certainly distinguished from each other.

7. From the expectoration's being attended with a hectic fever. A catarrh, or expectoration of mucus, is often attended with fever; but never, so far as I have observed, with such a fever as I am presently to describe as a hectic. This, in my opinion, is the most certain mark of a purulent state in some part of the body; and if others have thought differently, I am persuaded that it has been owing to this, that, presuming upon the mortal nature of a confirmed or purulent phthisis, they have considered every case in which a recovery happened, as a catarrh only: but that they may have been mistaken in this, will be shown hereafter.

11. At length, however, evening exacerbations become remarkable ; and by degrees the fever assumes the exquisite form of hectic.
12. A hectic fever has the form of a remittent, which has exacerbations twice every day.
13. The first of these occurs about noon, sometimes a little sooner or later ; and a slight remission of it happens about five afternoon.
14. This last is soon succeeded by another exacerbation, gradually increasing till after midnight : but after two o'clock of the morning, a remission takes place, which becomes more and more considerable as the morning advances.
15. The exacerbations are frequently attended with some degree of cold shivering ; or at least, the patient is exceedingly sensible to any coolness of the air, seeks external heat, and often complains of a sense of cold, when, to the thermometer, his skin is preternaturally warm. Of these exacerbations, that of the evening is always the most considerable.

It has commonly been given as a part of the character of a hectic fever, that an exacerbation of it commonly appears after the taking food ; and it is true that dinner, which is taken at noon,

or

or after it, does seem to occasion some exacerbation.

But this must not make us judge the mid-day exacerbation to be the effect of eating only; for I have often observed it to come on an hour before noon, and often some hours before dinner; which, in this country at present, is not taken till some time after noon.

It is indeed to be observed, that in almost every person, the taking food occasions some degree of fever: but I am persuaded this would not appear so considerable in a hectic, were it not that an exacerbation of fever is present from another cause; and accordingly, the taking food in the morning has hardly any sensible effect.

I have thus described the general form of hectic fever; but many circumstances attending it, are further to be taken notice of.

16. The fever I have described does not commonly subsist long, till the evening exacerbations become attended with sweatings; which continue to recur, and to prove more and more profuse, through the whole course of the disease.

17. Almost from the first appearance of the hectic, the urine is high-coloured, and deposits a copious branny red sediment, which hardly ever falls close to the bottom of the vessel.

18. In the hectic, the appetite for food is generally

nerally less impaired than in any other kind of fever.

19. The thirst is seldom considerable; the mouth is commonly moist; and as the disease advances, the tongue becomes free from all fur, appears very clean; and in the advanced stages of the disease, the tongue and fauces appear to be somewhat inflamed, and become more or less covered with aphthæ.
20. As the disease advances, the red vessels of the adnata of the eye disappear, and the whole of the adnata becomes of a pearly white.
21. The face is commonly pale; but, during the exacerbations, a florid red, and an almost circumscribed spot, appear on each cheek.
22. For some time, in the course of a heëtic, the belly is bound; but in the advanced stages of it, a diarrhoea almost always comes on, and continues to recur frequently during the rest of the disease, alternating in some measure with the sweatings mentioned above.
23. The disease is always attended with a debility, which gradually increases during the course of it.
24. During the same course an emaciation
takes

takes place, and goes to a greater degree than in almost any other case.

25. The falling off of the hairs, and the ad-
unique form of the nails, are also symptoms
of the want of nourishment.
26. Towards the end of the disease, the feet
are often affected with œdematous swell-
ings.
27. The exacerbations of the fever are seldom
attended with any head-ach, and scarcely
ever with delirium.
28. The senses and judgment commonly re-
main entire to the very end of the disease ;
and the mind, for the most part, is confi-
dent and full of hope.
29. Some days before death, a violent purg-
ing comes on, the legs swell, the cough
stops, the matter is accumulated, and the
patient dies suffocated.

The Rev. William Gorfuch, by keeping a re-
gister for ten years at Shrewsbury, discovered that
the number of deaths from consumption was, in
his parish, somewhat more than one in four. By
favour of a friend, I possess, says the philanthro-
pic Dr. Beddoes, the abstract of a similar register
for one of the parishes in Bristol, where the pastor
has been commendably attentive to the enume-
ration of his flock. By enquiry from house to
house, he found the population to be about
10,000. The following table shews the morta-
lity.

lity, registered under the heads *decline* and *consumption*. But it is to be observed, that the same sources of inaccuracy exist here as in the London accounts. The persons (mostly of the lower class) who report the deaths, refer every complaint of slow progress and attended with emaciation, to consumption or decline. Consequently, the number under this head is greater than of those whom real phthisis pulmonalis cuts off. Many also are interred at different burying-places, and of course not registered. But there is no reason why the latter circumstance should be supposed to affect the proportions.

<i>Years.</i>	<i>Total Deaths.</i>	<i>By Consumption or Decline.</i>
1790	158	56
1791	202	104
1792	215	90
1793	235	107
1794	213	108
1795	215	127
1796	216	91
	<hr/> 1511	<hr/> 683

What may be collected from private practice, does not, I believe, in any respect, tend to invalidate the conclusion deducible from these statements.

The disease is seen sometimes to perform an operation

ration more severe than that of decimation, leaving alive one or two members only out of a large family. I was not long since consulted for a phthifical girl, who had lost six (that is to say, all) her brothers and sisters in the same way. There lies before me a letter, describing the phthifical symptoms of a young person (the last of his name) and containing a list of father, mother, two sisters, and a first cousin, who, in consequence of similar attacks, had followed one another to the grave in the space of about five years. These are far from being all the instances I have known; and scarce a physician of moderate experience but must have met with instances equally deplorable.

Could a general assembly of British parents be convened for the mutual communication of family disasters, originating in this source, how many thousands might with very little variation, adopt the language of Nestor, when he speaks of the havoc occasioned among the Greeks, by the war at Troy!

καλέκταθεν ὅσσοι ἄριστοι
 Ἐνθα μὲν Ἀίας κείλαι ἄρῃος, ἔνθα δ' Ἀχιλλεύς,
 Ἐνθα δὲ Πατρόκλος, θεοφιν μῆσσερ Ἀταλάντος
 Ἐνθα δ' ἔμμε Φίλος υἱός—————

Shall I the dire distressful scenes review;
 And open all a parent's grief anew?

• Trace

Trace the long roll of death, and, forrowing, tell
How, mark'd by fate, the best and loveliest fell?

There Ajax huge, Achilles there the brave,
And young Patroclus found an early grave;
There too my child————

The fatality and frequency of consumption are better understood than its severity. Writers of romance (whether from ignorance or because it suits the tone of their narrative) exhibit the slow decline of the consumptive as a state on which the fancy may agreeably repose, and in which not much more misery is felt than is expressed by a blossom, nipped by untimely frosts. Those who only see the sufferers in passing, are misled by the representation. And I have heard many persons thus prepossessed, after closely attending a sick friend, declare their surprise not less than their horror, at the unexpected scenes of varied and protracted misery which they have been condemned to witness.

To lead the imagination through some of these scenes, might have its use in creating a salutary alarm. But I feel myself totally unequal to the task. I do not speak, says Dr. Beddoes, of the difficulty of noting down the obvious sensible tokens by which the calm practitioner of medicine may recognize the complaint in its various stages—this is easy
• 3 • enough,

enough, and authors do ^{it} every day, as monks count their bead-roll—but of the difficulty of bringing out all the patient's feelings into distinct relief, and delineating a picture which a parent, fresh from the loss of a child, shall acknowledge.

Consumption is thus elegantly and feelingly described by Dr. Beddoes, the short teasing cough at first, provoked by incessant tickling in the throat, as if the minute fragment of some extraneous body had immoveably fixed itself there; the subsequent hard rending cough, attended sometimes by retching and vomiting, sometimes by stitches which necessitate the most violent struggle against the continued solicitation to cough, and severely punish a moment of inattention; the expectoration sometimes nauseous, always offensive to the eye and harassing when it is not free; the languor with which the patient finds himself overpowered, when his attention is not occupied by some among his various fixed or flying pains; the extremes of cold and heat through which he is carried by the daily returns of hectic; the sweats in which his repose by night drenches him; the breathlessness on motion or without motion, arising by degrees to a sense of drowning, and terminating in actual drowning, when there is no longer strength to bring up the fluids, secreted in the chest; the disorder in the bowels, towards the last always threatening, and finally unrestrainable, while it cuts off those in-

dulgencies which the very thirst it creates or aggravates, impatiently demands; these are but a part of the torments under which the physician, during his transient visit, in an immense majority of instances, sees the consumptive labouring. And what are the few minutes of a physician's call, compared to the whole twenty-four hours, lengthened out as they often are to the tenants of the sick chamber, by pain and incapability of amusement on one side, and by tender concern on the other?

Into the catalogue of evils flowing from any cause, those that affect the bye-standers should be received, as well as those that affect the principal party. Thus in the early stage of consumption, how painful must it be to perceive female delicacy, vainly struggling against an increasing and inexorable disease, and to have the avowal extorted partly by affectionate urgency, partly by distress! After the full disclosure is made, how horrible (according to circumstances and the character of the medical attendant) for the parent to listen to his frank explanation, to search for the hidden meaning of the looks, or to pierce through the clumsy dissimulation! The despondence which (whatever is said to the contrary) the sick not unfrequently express, is miserable. The sanguine hope which an hour of sunshine commonly excites, is more miserable still. What is worst perhaps, is the knowledge of the patient's insecurity, during these

these intervals of ease! The storm of symptoms, that has so often broken in at once upon the most apparent settled calm, allowing the watchful friends no respite from their anxiety. And how shocking at last (under a consciousness that the event will give the heart a blow from which it can never fully recover) to be driven to call upon death to close the long series of sufferings!

PRACTICAL OBSERVATIONS.

SECT. LVIII.

DYSPNŒA, OR DIFFICULTY OF BREATHING *.

THE exercise of respiration, and the organs of it, have so constant and considerable a connection with almost the whole of the other functions and parts of the human body, that upon almost every occasion of disease, respiration must be affected. Accordingly, some difficulty and disorder in this function are in fact symptoms very generally accompanying disease. It is, however, more particularly symptomatic of inflammation of the lungs, and chlorosis.

We must therefore distinguish between symptomatic and idiopathic affections ; that is, between those difficulties of breathing which are symptoms only of a more general affection, or of a disease subsisting primarily in other parts than the organs of respiration, and that difficulty of breathing which depends upon a primary affection of the lungs themselves.

It is usually the sequel of other diseases, and arises from rupture of the air-cells, or adhesion preventing a free exercise of the lungs.

From δυσ, difficult, and πνέω, to breathe.

PRACTICAL

PRACTICAL OBSERVATIONS



 SECT. LIX.

DYSPNOEA PITUITOSA. PITUITOUS ASTHMA.

THIS is catarrhus senilis of Sydenham: it comes on

1. With a humid cough frequent in winter, but which disappears in summer.
2. The breathing is difficult upon using of exercise.
3. The lungs always appear oppressed.
4. After a time the cough is equally teasing both winter and summer.

It ends in hydrothorax, when it may be known

1. By the pale bloated looks of the patient.
2. Swelled legs.
3. Small quantity of water.
4. Anxiety.
5. Oppressed pulse.
6. And blueness of the lips.

The dyspnoea calculosa, arises from earthy concretions formed in the lungs. The spitting up of such concretions, with the difficulty of breathing, alone discloses the disease.

Or it terminates in Phthisis.

PRACTICAL

PRACTICAL OBSERVATIONS.

SECT. LX.

HYDROTHÓRAX, OR WATER IN THE CHEST.

THE preternatural collection of serous fluid in the thorax, to which we give the appellation of *Hydrothorax*, occurs more frequently than has been imagined. Its presence, however, is not always to be very certainly known at the onset; and it often takes place to a considerable degree before it is discovered.

These collections of watery fluids in the thorax, are found in different situations. Very often the water is found at the same time in both sacs of the pleura, but frequently in one of them only. Sometimes it is found in the pericardium alone; but for the most part it only appears there when at the same time a collection is present in one or both cavities of the thorax. In some instances, the collection is found to be only in that cellular texture of the lungs which surrounds the bron-

* From *ὕδωρ*, water, and *θώραξ*, the breast.

chia,

chiæ, without there being at the same time any effusion into the cavity of the thorax.

Pretty frequently the water collected consists chiefly of a great number of hydatides in different situations; sometimes seemingly floating in the cavity, but frequently connected with, and attached to, particular parts of the internal surface of the pleura.

From the collection of water being thus in various situations and circumstances, symptoms arise which are different in different cases; and from thence it becomes often difficult to ascertain the presence and nature of the affection. I shall, however, endeavour here to point out the most common symptoms, and especially those of that principal and most frequent forms of the disease, when the serous fluid is present in both sacs of the pleura, or, as we usually speak, in both cavities of the thorax.

1. The disease frequently comes on with a sense of anxiety, about the lower part of the sternum.
2. This, before it has subsisted long, comes to be joined with some difficulty of breathing; which at first appears only upon the person's moving a little faster than usual, upon his walking up an acclivity, or upon his ascending a stair-case: but after some time, this difficulty of breathing becomes more constant and considerable, especially during

during the night, when the body is in an horizontal situation.

3. Commonly, at the same time, lying upon one side is more easy than upon the other, or perhaps lying upon the back more easy than upon either side.
4. These circumstances are usually attended with a frequent cough, that is at first dry ; but which, after some time, is accompanied with an expectoration of thin mucus. With all these symptoms, the hydrothorax is not certainly discovered, as the same symptoms often attend other diseases of the breast.
5. When, however, along with these symptoms, there is at the same time an œdematous swelling of the feet and legs, a leucophlegmatic paleness of the face, and a scarcity of urine, the existence of a hydrothorax can be no longer doubtful. Whilst the presence of the disease is somewhat uncertain, there is a symptom which sometimes takes place, and has been thought to be a certain characteristic of it ; and that is,
6. When, soon after the patient has fallen asleep, he is suddenly awakened with a sense of anxiety and difficult breathing, and with a violent palpitation of the heart. These feelings immediately require an erect posture ;

posture ; and very often the difficulty of breathing continues to require and to prevent sleep for a great part of the night.

7. Soon after this disease has made some progress, the pulse commonly becomes irregular, and frequently intermitting.

PRACTICAL OBSERVATIONS.

SECT. LXI.

ANGÍNA* PÉCTORIS.

DR. HEBERDEN was the first who described this disease, though it is extremely dangerous, and, by his account, not very rare. It seizes those who are subject to it when they are walking, and particularly when they walk soon after eating,

1. With a most disagreeable and painful sensation in the breast, which seems to threaten immediate destruction: but the moment they stand still, all the uneasiness vanishes.
2. In all other respects the patients at the beginning of this disorder are well, and have no shortness of breath; from which the *angina pectoris* is totally different.
3. After it has continued some months, the fits will not cease instantaneously on standing still; and it will come on not only when the patients are walking, but when

* From *ανχεῖν*, to strangle.

they

they are lying down, and oblige them to rise up out of their beds every night for many months together.

4. In one or two very inveterate cases, it has been brought on by the motion of a horse or carriage, and even by swallowing, coughing, going to stool, speaking, or by any disturbance of mind. The persons affected were all men, almost all of whom were above fifty years of age, and most of them with a short neck and inclining to be fat. Something like it, however, was observed in one woman, who was paralytic; and one or two young men complained of it in a slight degree. Other practitioners have observed it in very young persons.

When a fit of this sort comes on by walking, its duration is very short, as it goes off almost immediately upon stopping. If it comes on in the night, it will last an hour or two. Dr. Heberden met with one in whom it once continued for several days; during all which time the patient seemed to be in imminent danger of death. Most of those attacked with the distemper died suddenly: though this rule was not without exceptions; and Dr. Heberden observed one who sunk under a lingering illness of a different nature.

The *os sterni* is usually pointed to as the seat of this

this malady; but it ~~seems~~^{feels} as if it was under the lower part of that bone, and at other times under the middle or upper part, but always inclining more to the left side; and in many cases there is joined with it a pain about the middle of the left arm, which appears to be seated in the biceps muscle.

The appearance of Dr. Heberden's paper in the Medical Transactions very soon raised the attention of the faculty, and produced other observations from physicians of eminence: namely, Dr. Fothergill, Dr. Wall of Worcester, Dr. Haygarth of Chester, and Dr. Percival of Manchester. It also induced an unknown sufferer under the disease to write Dr. Heberden a very sensible letter, describing his feelings in the most natural manner; which, unfortunately, in three weeks after the date of this anonymous epistle, terminated in a sudden death, as the writer himself had apprehended.

The youngest subject that Dr. Fothergill ever saw afflicted with this disorder was about thirty years of age; and this person was cured. The method that succeeded with him was a course of pills, composed of the mass of gum pill, soap, and native cinnabar; with a light chalybeate bitter; this was continued for some months, after which, he went to Bath several successive seasons, and acquired his usual health: he was ordered to
be

be very sparing in his diet; to keep the bowels open; and to use moderate exercise on horseback, but not to take long or fatiguing walks.

The only symptom in this patient that is mentioned, was a stricture about the chest, which came on if he was walking up hill or a little faster than ordinary, or if he was riding a very brisk trot; for moderate exercise of any kind did not affect him: and this uneasy sensation always obliged him to stop, as he felt himself threatened with immediate death, if he had been obliged to go forward.

It is the sharp constrictive pain across the chest, that (according to Dr. Fothergill's observation) particularly marks this singular disease; and which is apt to supervene upon a certain degree of muscular motion, or whatever agitates the nervous system.

In such cases as fell under the inspection of Dr. Fothergill, he very seldom met with one that was not attended with an irregular and intermitting pulse; not only during the exacerbations, but often when the patient was free from pain and at rest: but Dr. Heberden observes, that the pulse is, at least sometimes, not disturbed; and mentions his having once had an opportunity of being convinced of this circumstance, by feeling the pulse during the paroxysm.

But no doubt these varieties, as well as many other little circumstances, will occur in this disease,

ease, as they do in every other, on account of the diversity of the human frame; and if those, which in general are found to predominate and give the distinguishing character, be present, they will always authorize us in giving the name to the disease: thus, when we find the constrictory pain across the chest, accompanied with a sense of strangling or suffocation; and still more, if this pain should strike across the breast into one or both arms; we should not hesitate to pronounce the case an *angina pectoris*.

As to the nature of this disease, it appears to be purely spasmodic: and this opinion will readily present itself to any one who considers the sudden manner of its coming on and going off; the long intervals of perfect ease; the relief afforded by wine, and spirituous cordials; the influence which passionate affections of the mind have over it; the case which comes from varying the posture of the head and shoulders, or from remaining quite motionless; the number of years for which it will continue, without otherwise disordering health; its bearing so well the motion of a horse or carriage, which circumstance often distinguishes spasmodic pains from those which arise from ulcers; and lastly, its coming on for the most part after a full meal, and in certain patients at night, just after the first sleep, at which time the incubus, convulsive asthma, and other ills, justly attributed to the disordered functions
of

of the nerves, are peculiarly apt to return or to be aggravated.

From all these circumstances taken together, there can be little doubt that this affection is of a spasmodic nature: but though it should be admitted, that the whole distress in these cases arise from spasm, it may not be so easy to ascertain the particular muscles which are thus affected.

The violent sense of strangling or choaking, which shews the circulation through the lungs to be interrupted during the height of the paroxysm; and the peculiar constrictive pain under the sternum, always inclining (according to Dr. Heberden's observation) to the left-side; together with that most distressing and alarming sensation, which, if it were to increase or continue, threatens an immediate extinction of life; might authorize us to conclude that the heart itself is the muscle affected: the only objection to this idea, and, if it had been constantly observed, it would be insurmountable, is, that the pulse is not always interrupted during the paroxysm. The appearance in two of the dissections, favours the opinion that the spasm affects the heart*; as in one subject the left ventricle (and, though it be not mentioned, we may presume the right one also) was found as empty of blood as if it had been washed; and in another, the substance of the heart appeared

* If so, it would resemble the cases recorded, vol. i, page 378, of this work.

whitish,

whitish, not unlike a ligament; as it should seem, in both cases, from the force of the spasm, squeezing the blood out from the vessels and cavities.

If this hypothesis be allowed, we must conclude that the spasm can only take place in an inferior degree, as long as the patient continues to survive the paroxysm; since an affection of this sort, and in this part, of any considerable duration or violence, must inevitably prove fatal: and accordingly, as far as could be traced, the persons who have been known to labour under this disease have in general died suddenly.

But dissections also shew, that whatever may be the true seat of the spasm, it is not necessary for the bringing of it on, that the heart, or its immediate appendages, should be in a morbid state; for in three out of the six that have as yet been made public; these parts were found in a sound state.

On opening the body of the poor gentleman who wrote the letter to Dr. Heberden, "upon the most careful examination, the heart, with its vessels and valves, were all found in a natural condition."

In the case communicated by Dr. Percival to the publishers of the Edinburgh Medical Commentaries, "the heart and aorta descendens were found in a sound state." And in Dr. Haygarth's patient, "on opening the thorax, the lungs, pericardium, and heart appeared perfectly sound." Not to mention Dr. Fothergill's patient (R. M.),

in

in whose body the only morbid appearance about the heart was a small white spot near the apex. So that the cause, whatever its nature might have been, was at too great a distance, or of too subtile a nature, to come under the inspection of the anatomist. But there was a circumstance in two of the subjects that is worthy of remembrance, and which shews that the crasis of the blood, while they were living, must have been greatly injured, namely, its not coagulating, but remaining of a cream-like consistence, without any separation into serum and crassamentum.

PRACTICAL OBSERVATIONS.

SECT. LXII.

ASTHMA .

IN conformity with common notions, I have considered asthma as a disorder of the lungs, for if it were considered as an affection more properly of the diaphragm, it then would come after palpitation of the heart, which I have treated of under the title syncope, although it may be considered as distinct, and symptomatic of a defective stimulation, as is seen in breathing of mephitic air, and in chlorosis, and other diseases marked with a defective oxygenation of the blood.—Some writers would incline one to make it a symptom of a peculiar disease of the stomach, as the Rev. Mr. Townsend, but in whatever light it be considered, it may occupy with great propriety its present place.

The Asthma is a chronic disease, which may continue to give very great distress at intervals,

* From *ασθμαζειν*, to breathe with difficulty.

for

for a considerable number of years. Sir John Floyer, when he wrote his treatise on this disease, had laboured under repeated paroxysms for thirty years.

The common distinction is into the

1. Humid, and
11. Dry.

The former is accompanied with an expectoration of mucus, or purulent matter, but the latter is not so attended.

1. This disease is frequently hereditary.
2. It seldom appears very early in life, and hardly till the time of puberty, or after it.
3. The attacks of this disease are generally in the night time, or towards the approach of night; but there are also some instances of their coming on in the course of the day.
4. At whatever time they come on, it is for the most part suddenly, with a sense of tightness and stricture across the breast, and a sense of straitness in the lungs impeding respiration.
5. The person thus attacked, if in a horizontal situation, is immediately obliged to get into somewhat of an erect posture, and requires a free and cool air.
6. The difficulty of breathing goes on for some time increasing; and both inspira-

tion and expiration are performed slowly, and with a wheezing noise.

7. In violent fits, speaking is difficult and uneasy.
8. There is often some propensity to coughing, but it can hardly be executed.
9. These symptoms often continue for many hours together, and particularly from midnight till the morning is far advanced.
10. Then commonly a remission takes place by degrees; the breathing becomes less laborious and more full, so that the person can speak and cough with more ease; and if the cough brings up some mucus, the remission becomes immediately more considerable, and the person falls into a much wished-for sleep.
11. During these fits the pulse often continues in its natural state; but in some persons the fits are attended with a frequency of pulse, and with some heat and thirst, as marks of some degree of fever.
12. If urine be voided at the beginning of a fit, it is commonly in considerable quantity and without colour or odour; but, after the fit is over, the urine voided is in the ordinary quantity, of a high colour, and sometimes deposits a sediment.
13. In some persons, during the fit, the face is a little flushed and turgid; but more commonly

commonly it is somewhat pale and shrunk.

14. After some sleep in the morning, the patient, for the rest of the day, continues to have more free and easy breathing, but it is seldom entirely such. He still feels some tightness across his breast, cannot breathe easily in a horizontal posture, and can hardly bear any motion of his body, without having his breathing rendered more difficult and uneasy.
15. In the afternoon he has an unusual flatulency of his stomach, and an unusual drowsiness; and very frequently these symptoms precede the first attacks of the disease; but, whether these symptoms appear or not, the difficulty of breathing returns towards the evening; and then sometimes gradually increases, till it becomes as violent as in the night before; or, if, during the day, the difficulty of breathing has been moderate, and the person got some sleep in the first part of the night, he is, however, waked about midnight, or at sometime between midnight and two o'clock in the morning; and is then suddenly seized with a fit of difficult breathing, which runs the same course as the night before.
16. In this manner fits return for several nights

nights successively, but generally, after some nights passed in this way, the fits suffer more considerable remissions.

17. This especially happens when the remissions are attended with a more copious expectoration in the mornings; and that this continues from time to time throughout the day. In these circumstances asthmatics, for a long time after, have not only more easy days, but also enjoy nights of entire sleep, without the recurrence of the disease.

When this disorder, however, has once taken place in the manner above described, it is ready to return at times for the rest of life.

Changes of weather are usually felt very sensibly by asthmatic people, who in general cannot live with tolerable ease in the atmosphere of large cities; though we shall sometimes meet with patients who agree better with this air, which is so loaded with gross effluvia of various kinds, than with the purest that can be found in country situations.

When the asthma is found to depend on some other disease, whether it be the gout or intermittent fever, or when it proceeds from the striking in of some cutaneous eruption, regard must always be had to the primary disease: thus, in the *asthma arthriticum*, sinapisms to the feet, or blistering, will be absolutely necessary, in order if possible

ble to bring on a fit of the gout. And when the dregs of an ague give rise to an asthma, which is termed *Febriculosum*, and invades at regular intervals, we must have recourse to the cortex.

Asthma generally terminates in Hydrothorax, or Phthisis Pulmonalis.

PRACTICAL OBSERVATIONS.

SECT. LXIII.

IN the order we proceed now to the stomach, the source of a vast variety of symptoms, or what have by some medical writers been accounted as so many diseases, all which we shall include under the general term

DYSPEPSIA*, OR INDIGESTION.

It is characterized by

1. A pallid countenance.
2. A want of appetite.
3. Frequent squeamishness.
4. Eructations of wind.
5. Acid eructations.
6. Distention of the stomach.
7. Pain at the pit of the stomach, felt especially upon any pressure.
8. The pain on the left side, distinguishing it from pleurisy, with
9. The pulse slow, and small.

* From *δυσ*, bad, and *πεπτείν*, to concoct.

10. Great depression of spirits.
11. Costiveness.
12. The lower extremities extremely cold, from spasms of the crura of the diaphragm obstructing the blood in its descent, and determining to the head: hence,
13. Flushes of heat in the face.
14. Beatings of the temporal artery.
15. Giddiness.
16. Hysteria, or temporary insanity.
17. Convulsions.
18. Vomiting of a fluid like coffee.
19. A sudden and great flux of pale urine.
20. A dry hicking nervous cough.
21. Horrid dreams, generally of precipices.
22. It is sometimes attended with a flow of water from the mouth*.

The imbecility of the stomach, and the consequent symptoms, may, however, frequently depend upon some organic affection of the stomach itself, as tumour, ulcer, or schirrosity; or upon some affection of other parts of the body communicated to the stomach, as in gout, amenorrhœa, and some others. In all these cases, however, the dyspeptic symptoms are to be considered as secondary or sympathetic affections,

* This, by Cullen, has been considered as denoting a distinct disease, called by him, *Pyrosis*.

to be cured only by curing the primary disease. Such secondary and sympathetic cases cannot, indeed, be treated of here ; but, as I presume that the imbecility of the stomach may often take place without either any organic affection of this part, or any more primary affection, in any other part of the body ; so I suppose and expect it will appear, from the consideration of the remote causes, that the dyspepsia may be often an idiopathic affection, and that it is therefore properly taken into the system of methodical Nosology, and becomes the subject of our consideration here.

There can be little doubt that, in most cases, the weaker action of the muscular fibres of the stomach, is the most frequent and chief cause of the symptoms mentioned ; but I dare not maintain it to be the only cause of idiopathic dyspepsia. There is, pretty certainly, a peculiar fluid in the stomach of animals, or at least a peculiar quality in the fluids, that we know to be there, upon which the solution of the aliments taken into the stomach chiefly depends : and it is at the same time probable, that the peculiar quality of the dissolving or digesting fluids may be variously changed, or that their quantity may be, upon occasion, diminished. It is therefore sufficiently probable, that a change in the quality or quantity of these fluids may produce a considerable difference in the phenomena of digestion,

digestion, and particularly may give occasion to many of the morbid appearances mentioned.

This seems to be very well founded, and points out another proximate cause of dyspepsia beside that we have already assigned: but, notwithstanding this, as the peculiar nature of the digestive fluid, the changes which it may undergo, or the causes by which it may be changed, are all matters so little known, that I cannot found any practical doctrine upon any supposition with respect to them; and as, at the same time, the imbecility of the stomach, either as causing the change in the digestive fluid, or as being induced by that change, seems always to be present, and to have a great share in occasioning the symptoms of indigestion; so I shall still consider the imbecility of the stomach as the proximate and almost sole cause of dyspepsia. And I the more readily admit of this manner of proceeding; as, in my opinion, the doctrine applies very fully and clearly to the explaining the whole of the practice which experience has established as the most successful in this disease.

Considering this, then, as the proximate cause of dyspepsia, I proceed to mention the several remote causes of this disease, as they are such as, on different occasions, seem to produce a loss of tone in the muscular fibres of the stomach.

They

They may, I think, be considered under two heads, the *first* is, of those which act directly and immediately upon the stomach itself: the *second* is, of those which act upon the whole body, or particular parts of it, but in consequence of which the stomach is chiefly or almost only affected.

Of the first kind are,

1. Certain sedative or narcotic substances taken into the stomach, such as tea, coffee, tobacco, ardent spirits, opium, bitters, aromatics, putrids, and acescents.
2. The large and frequent drinking of warm water, or of warm watery liquids.
3. Frequent surfeit, or immoderate repletion of the stomach.
4. Frequent vomiting, whether spontaneously arising, or excited by art.
5. Very frequent spitting, or rejection of saliva.

Those causes which act upon the whole body, or upon particular parts and functions of it, are,

1. An indolent and sedentary life.
2. Vexation of mind, and disorderly passions of any kind.
3. Intense study, or close application to business too long continued.
4. Frequent intoxication; which partly belongs to this head, partly to the former.
5. The

5. The being much exposed to moist and cold air when without exercise.

Though this disease, as proceeding from the last set of causes, may be considered as a symptomatic affection only; yet, as the affection of the stomach is generally the first, always the chief, and often the only, effect which these causes produce or discover, I think, the affection of the stomach may be considered as the disease to be attended to in practice; and the more properly so, as in many cases the general debility is only to be cured by restoring the tone of the stomach, and by remedies first applied to this organ.

It remains now to be observed, that violent or long continued complaints of the stomach, often terminate in an apoplexy, palsy, jaundice, dropsy, tympany, or phthisis. Now, from what has been said, it will not appear strange, that the brain and nerves may, by the continuance or frequent repetition of such shocks, be so weakened or disordered, that not only fatuity, a deep melancholy, or mania, but also a palsy or an apoplexy, may ensue. Further, as nervous disorders are often owing to some morbid matter in the blood, arising from a defective chylication: from weakness of the stomach and intestines, this imperfectly stimulates the brain or origin of the nerves, and it is easy to conceive, how a palsy, apoplexy, or tabes, may be the consequence.

Again, since hypochondriac and hysteric disorders, are sometimes occasioned by obstructions in the abdominal viscera, and often give rise to them; and as from a bad digestion the chyle must be ill prepared, it will appear why those diseases do sometimes terminate in the jaundice or dropfy.

It has been observed also, that patients much afflicted with those ailments have at length fallen into a tympanites, which may be thus accounted for. I have shown above, that the great predisposing cause of nervous, hypochondriac, and hysteric disorders, is a particular weakness and delicacy, or uncommon sensibility of the stomach and bowels; whence, from slight causes, they are often affected with spasms. Now, when the spasmodic contractions of the alimentary canal do not continue long, the wind that was pent up is allowed to move from one place to another, and is at last expelled either upwards or downwards: but when the stomach and intestines, by reason of their weakness, and small, but continued, spasms, have been inflated by slow degrees, the irritation occasioned by this distension increases the spasm so much, that the air, continually generated by the aliment in time of digestion, is mostly retained, or, at least, is not discharged in such a quantity as to relieve the patient, or sensibly to diminish the swelling of the belly.

Lastly,

Lastly, a phthisis pulmonalis may also be the consequence of nervous disorders, when the morbid matter producing them falls chiefly upon the lungs; or when the vitiated chyle or blood forms obstructions in that organ.

And here it may be worth observing, that while the morbid matter producing the hypochondriac disease, chiefly affects the stomach and bowels, the patients are always apprehensive, and often greatly alarmed from any trifling increase or variation of their complaints, as if they were in immediate danger of dying; but after this matter has left its own seat, and, by fixing on the lungs, has brought on an incurable phthisis, they generally cease to be apprehensive or fearful, and cherish the hopes of life to the last. The reason is, that when the lungs are affected, there are no such uneasy feelings excited in the body, nor fear and despondency in the mind, as when the stomach and intestines suffer, which are not only possessed of a much more delicate sensibility than the lungs, but have also a more remarkable sympathy with the brain, and whole nervous system.

PRACTICAL OBSERVATIONS.

SECT. LXIV.

INCUBUS, OR NIGHT-MARE.

IN this disease, which might with much propriety be included under the article, *Dyspepsia*, the patient, in time of sleep, imagines he feels

1. An uncommon oppression or weight about his breast and stomach, which he can, by no effort shake off;
2. He now groans, and sometimes cries out, though oftener, he attempts to speak in vain.
3. He imagines himself to be struggling with strong men, or devils, to be in a house on fire, or in danger of being drowned in the sea or some river.
4. In attempting to run away from danger, or climb up a hill, he fancies he falls back as much after every step as he had advanced before.
5. The terror excited by the frightful ideas attending the night-mare, sometimes occasions a tingling of the ears, and a tremor over the whole body.

* From incumbere, to press upon.

This

This disorder has been commonly supposed to proceed from a stagnation of the blood in the sinuses of the brain, or in the vessels of the lungs; or from too great a quantity of blood being sent to the head.

The horizontal posture in time of sleep, and the pressure of the stomach upon the aorta, in a supine situation, have been thought sufficient to occasion a more than usual distension of the sinuses and other vessels of the brain; and the weight of the heart pressing on the left auricle and large trunks of the pulmonary veins, may, it is said, prevent the easy return of the blood from the lungs, and so produce an oppression, and sense of weight and suffocation in the breast*. But not to enter into a particular examination of these opinions, which are far from being satisfactory, I shall only observe, that if they were true, some degree of the night-mare ought to happen to every person that lies on his back, especially after eating a full meal. Further, if a horizontal situation could overcharge the brain with blood, so as to occasion the incubus, how comes it that people, who remain for sometime in an inverted posture, do not feel this disease beginning to attack them? And why does a slighter degree of the night-mare sometimes seize people who sleep

* See Dr. Bond's ingenious Essay on the Incubus. .

in an erect situation in a chair*? As the weight of the stomach, even when filled with food, can have scarce any effect upon the motion of the blood in the aorta, so the pressure of the heart is by much too small to be able, sensibly, to retard the motion of that fluid in the pulmonary veins; otherwise people exhausted by tedious diseases, who generally lie on their back, would be constantly affected with the incubus.

We know, that certain medicines or poisons, worms, and even corrupted bile, or other humours, by disagreeably affecting the nerves of the stomach, produce an oppression about the præcordia, wild imaginations, frightful dreams, raving, and insensibility: and there is no doubt, that low spirits, melancholy, and disturbed sleep, often proceed from a disordered state of the stomach. Is it not probable, that the night-mare has its seat chiefly in the same organ? If epileptic fits often proceed from the stomach, why may not the incubus, which has been considered by Galen as a nocturnal or flighter epilepsy, have its seat in that part? People troubled with nervous and hypochondriac ailments, and who have delicate or flatulent stomachs, are more subject than others to this disorder.—A heavy or flatulent supper greatly

* Something of this kind I have experienced myself, not only after eating, but also before supper, when my stomach was out of order, and troubled with wind.—Dr. Whytt.

increases the night-mare in those who are pre-disposed to it. The sympathy of the stomach with the head, heart, uterus, lungs, and diaphragm, is so remarkable, that there can be no difficulty in supposing the several symptoms of the incubus to arise from a disagreeable affection of the nerves of that organ.

When my stomach has been out of order, says Dr. Whytt, and troubled with wind, I have often perceived the incubus seize me before I was fully asleep, the uneasiness of which would make me get up suddenly. As soon as I was quite awake, I was generally sensible I had been affected with an uneasiness about my stomach, attended with a faintness, and some sort of oppression or suffocation about my breast, as if the circulation in my lungs had been a good deal obstructed. While I sat up in bed, or lay awake, I felt nothing of these symptoms, except, perhaps, some degree of uneasiness about my stomach; but when I was just about to fall asleep, this began to return again. In this way, I have often gone on, for two hours or more, in the beginning of the night. At last, I found that a dram of brandy after the first attack, kept me easy the whole night. This remedy has never failed to succeed with me, the few times I have had occasion to try it; for of late, since my stomach has been pretty sound, I have seldom felt in my sleep any of those uneasy sensations which resemble the night-mare.

From what has been said, it seems probable, that in the incubus the stomach is commonly the part primarily affected: I say commonly, because symptoms like those of the night-mare may sometimes arise without any fault in the stomach. Thus, I have known astmatic patients, whose lungs were much obstructed, who, in time of sleep, were greatly oppressed with a sense of suffocation, and disturbed with uneasy dreams: and Dr. Lower mentions a patient, who, though he would sleep pretty easily with his head inclined forward, yet in the opposite situation, he was always soon awaked with horrid dreams and tremors; the cause of which appeared, after his death, to have been a great quantity of water in the ventricles of the brain.

The incubus is most apt to seize persons when lying on their back; because in this position, on account of the stomach and other abdominal viscera pressing more upon the diaphragm, we cannot respire with the same ease as when we sit up, or lie on one side. Further, in that situation of the body, the food seems to lie heavier on the stomach, and wind in it does not escape so readily by the œsophagus or pylorus as in an erect posture when these passages are higher than the other parts of the stomach*. We are only affected
with

* When I have been liable to be attacked with a sensation of faintness at my stomach, I have found it always worse when I lay on my back in the night-time, and become better when

with the night-mare in time of sleep, because the strange ideas excited in the mind, in consequence of the disordered state of the stomach, are not then corrected by the external senses, as they are when we are awake ; nor do we by an increased respiration, or other motions of the body, endeavour to shake off any beginning uneasy sensation about the stomach or breast. The incubus generally seizes one in his first sleep, but seldom towards the morning, because at this time the stomach is much less loaded with food, than in the beginning of the night.

If the night-mare were owing to a stagnation of the blood in the lungs from the weight of the heart, or in the sinuses and other vessels of the brain, from the horizontal posture of the body, it would become greater the longer it continued, and would scarce ever go off spontaneously : but we know that this disease, after affecting people for some time, often gradually ceases, and is succeeded by refreshing sleep ; for as soon as the load of meat, or wind, or other cause disagreeably affecting the nerves of the stomach, is removed, the oppression and weight on the breast, wild imaginations, frightful dreams, &c. vanish, as all these proceed originally from the disorder

I got out of bed, or sat up in it : and a middle-aged woman, who, in the morning, was frequently subject to faintings, found that she could prevent them by getting up as soon as she perceived them about to come on.—Dr. Whytt.

of the stomach. It is worth while, however, to observe, that as neither wind, tough phlegm, nor crudities in the stomach, do ever occasion the symptoms of the hypochondriac disease, unless the nerves of that organ be indisposed; so neither a horizontal posture, sleep, nor heavy suppers, do ever produce the night-mare, at least in any considerable degree, unless the person be predisposed to it from the particular condition of the nerves of his stomach.

PRACTICAL OBSERVATIONS.

SECT. LXV.

DIABÈTES, OR IMMODERATE FLOW OF URINE.

THE Diabetes Méllitus*, though sometimes terminating in recovery, is yet well known to be a disease which has in general resisted every remedy hitherto recommended for its removal. Every attempt, therefore, to improve the practice in that affection, may justly be considered as deserving particular attention. The ingenious Dr. Rollo recommends a mode of treatment, which, in some instances, has been decidedly productive of remarkable benefit. It may justly, therefore, be considered as well meriting a fair trial in future cases.

The first case related, is that of Captain Meredith, of the Royal Artillery. When he came under Dr. Rollo's care, on the 16th of October 1796, he voided about twelve quarts

* From *διά*, through, and *καίρω*, to pass, and mel, honey.

of urine in twenty-four hours. This urine, seven quart-bottles of which he had preserved, having been voided during the course of the night, was of a light straw colour, had no urinous smell, but emitted somewhat of a violent flavour, and was very sweet to the taste. He was affected with excessive thirst, and had drank, during the day, seven or eight quarts. His tongue was somewhat whitish, but moist: there was a cleanness in his mouth, and he spat a white frothy saliva, of a sweetish taste. His appetite for food was variable, sometimes unusually keen, particularly at uncommon times, as during the night. His face was flushed, his skin dry, but not unusually warm, and his pulse did not exceed eighty-four strokes in the minute.

He was frequently sick, and threw up a viscid matter, of a bitterish taste, but with some sweetness. After eating, he complained of a pain of his stomach, which in general continued about half an hour.

He complained of a constant pain in the region of the kidneys, extending forwards, but more particularly in the right, in which there seemed to be a greater fulness and tenderness to the touch.

There was likewise a retraction of the testicle, with a weakness, sense of coldness, and at night an œdematous swelling of the leg on the same side.

He

He also complained of a pain and tenderness of the great toe. He felt also a singular fluttering sensation in his belly, extending from the situation of the kidneys.

He was regular in his bowels, though sometimes inclined to costiveness. His stools were of a greenish colour, and had no unpleasant smell.

His gums were reddish, and had the appearance as if affected by mercury. The teeth felt to him loose. There was a fulness about the eyes, with a turbid yellowish cast, and he had slight occasional head-achs.

He had not been particularly restricted in diet, which consisted of animal food and vegetables; and he drank from a pint to a bottle of port wine daily. His other drink was toast-water.

He used exercise, both in the way of riding and walking; but he could not walk above two miles without much fatigue.

At this time thirty-six ounces, Troy weight, of his urine, analyzed by Mr. Cruickshank, yielded by evaporation three ounces and one drachm of saccharine extract, of the appearance of molasses, but thicker. According to this proportion, his whole urine for a day, would have yielded twenty-nine ounces Troy weight; an astonishing quantity to be separated daily from the system. Treating some of this extract with the nitrous acid, Mr. Cruickshank procured the sac-

saccharine or oxalic acid. With a smaller proportion of the acid, it produced a substance which, in appearance, taste, and smell, could not be distinguished from honey.

Two portions of blood, about four ounces each, were taken from his arm. These in appearance exactly resembled what is described by Dr. Dobson, excepting that the serum did not impart a sensibly sweet taste. The crassamentum of the first cup had a slight buffy coat; the crassamentum of the second had more. The buffy coat in both was of a bluish colour, similar to what mercury sometimes produces. A portion of blood from a healthy person, drawn on the same day, was placed in the same room, and in the same circumstances with one of the portions of diabetic blood. In two days the diabetic blood assumed a caseous appearance on the surface, and the whole mass became dry and resinous, without having undergone any apparent putrefactive process. At the end of sixteen days, it remained in the same state; whereas the healthy blood exhibited evident marks of great putrefaction in four days; and it became necessary to throw it away on the seventh.

When this patient came under Dr. Rollo's care, his disease had been of seven months standing. During that time he had taken some remedies, under the direction of an eminent physician at Yarmouth, the principal of which were Peruvian

vian bark and alum. He had fallen away very considerably in flesh and fat ; for, in October 1794, when in apparent health, he weighed sixteen stones and eight pounds ; and in November 1796, he weighed only eleven stones and eight pounds, shewing a loss by the disease of no less than five stones in weight.

For six months preceding the attack of the diabetes, he was often sick, and vomited at least two or three times a week ; and he frequently brought up from the stomach, during these vomitings, different things which he had eaten several days before. These seemed to be unaltered, and the taste was very generally sour.

He always ate heartily, and drank freely, but not intemperately. He was fond of high-seasoned and fat dishes. He had been subjected to two regular attacks of gout, and had at other times two severe fits of cholic. He had been twice married, and had two children. He was, in the thirty-fourth year of his age, five feet eleven inches high, of a fair complexion, with light-brown hair, and dark blue eyes.

From an attentive consideration of all the circumstances of this case, what appeared to Dr. Rollo to be the principal objects of treatment, were, to destroy the saccharine process going on in the stomach, to promote a healthy assimilation, to prevent the supposed increase of absorption from the surface, to diminish the increased

creased action, and to change the imagined derangement of the kidneys.

With these intentions the following plan of treatment was resolved upon.

1. His diet to consist principally of animal food; for breakfast, a pint and a half of milk mixed with half a pint of lime water, or beef tea, with toasted bread; at dinner, game, and old meats which have been long kept, and, as far as the stomach may bear, fat and rancid old meats, as pork, taking care always to eat in moderation; for supper, the same as breakfast.
2. For drink, he was allowed daily four quarts of water which had been boiled, and in which was dissolved a drachm of the kali sulphuratum. He was strictly forbid to use any other article, excepting these, either in the way of meat or drink.
3. His skin to be anointed with hog's lard every morning. Flannel to be worn next the skin, and the gentlest exercise only to be permitted, but confinement to be preferred.

A draught to be taken at bed-time, consisting of twenty-five drops of tartarised antimonial wine, and twenty-five of tincture of opium, and the quantities to be gradually increased.

5. An ulceration, about the size of half a crown, was directed to be produced, and maintained externally, immediately opposite to each kidney.

And, lastly, his bowels were to be kept regularly open, by a pill of equal parts of aloes and soap.

This treatment was begun 19th of October, and, so soon as the 21st, some changes occurred. He made, in twenty-four hours, only six quarts of urine, and drank only three quarts of the sulphurated alkaline water. The urine was not so pale, had a cloud in it, and was more urinous in smell. On the 1st of November the urine did not exceed four quarts, while it was of a higher colour, and more urinous smell. His skin was moist and he perspired freely; his stools were large, and very offensive, and he was in every respect much easier, though he complained of much pain from the ulcerated parts of the loins. Imagining that the quantity of alkaline salt, which he took daily in the *kali fulphuratum*, might have some improper effect on the kidneys, it was resolved to try hepatised ammonia, on the suggestion of Mr. Cruickshank, who was of opinion, that it might prove a more certain and active medicine in diminishing the action of the stomach, as well as the action of the system in general. He was therefore directed to take five drops of it, in each half-pint tumbler

tumbler full of water, which he used as drink. The 1st day he took thirty-five drops at different times, which in the evening, produced sickness and vomiting, with giddiness and drowsiness. He was therefore directed to leave off the hepatised ammonia for one day, and then to begin with two drops to each tumbler full of water.

On the fourth, he drank only two pints of water, and made only two quarts of urine, which was not sweet, and deposited a red sandy, or lateritious sediment. On the 5th of November, the opiate at bed-time was discontinued; and on the 8th the rubbing with the hog's lard was left off.

Between the 4th and 14th of November, in consequence of some irregularities on the part of the patient, particularly drinking beer and tea, the disease was to a slight degree reproduced. On the 14th, therefore, an entire abstinence from vegetable matter was directed; nothing was allowed approaching nearer to it than milk; and even this was directed to be left off, and strong beef-tea substituted, should the disease not disappear. This soon produced a favourable change, his urine became again of a much higher colour, and its smell and taste quite urinous.

He afterwards continued for some time with tolerable regularity on the course already mentioned,

tioned, and by the 18th of December his disease seemed to be in a great measure overcome; he was therefore desired to eat half a pound of bread as a daily allowance, and to take exercise more freely.

On the 30th of December, Dr. Rollo found that since the 18th he had continued free from the disease. He was now in high spirits, and rapidly gaining flesh. His urine did not exceed two pints in the twenty-four-hours. It was often under that quantity, and perfectly urinous. He now weighed thirteen stones and one pound; so that he had gained about a stone and a half since the end of November; which furnished a convincing proof, not only of the removal of the disease, but also of the disposition to it.

After this period, Captain Meredith might be considered as continuing free from complaints. He took exercise freely, both in the way of walking and riding. He ate a sufficient proportion of bread, potatoes, and other vegetables, without any inconvenience. His appetite was good and natural, and his bowels regularly open. His urine continued perfectly natural, and, in general, did not exceed a quart in twenty-four hours. Of this urine, which was of the ordinary taste and smell, nine ounces were evaporated, and yielded of a brown and pungently saline bitterish-tasted matter, without tenacity,

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three drachms and twenty grains, a product excessively different from the saccharine extract resembling molasses, which his urine yielded in October. The product now obtained was very nearly the same, both in quantity and quality, as Dr. Rollo obtained from his own urine, which, he had every reason to believe, was in the healthy state.

About the middle of March, Captain Meredith continuing in a state of health, was ordered on active service; to which he very readily assented, being satisfied that his health now enabled him to execute the duties of his station.

The second case which Dr. Rollo has here very minutely detailed, but into the particulars of which we cannot propose to enter, is that of a general officer in the 57th year of his age, with whom the urinary discharge amounted to ten or twelve pints in the twenty-four hours; and, while the urine had a very sweet taste, he was at the same time subjected to the other common symptoms of diabetes. After his disease had been of at least three years standing, and after recourse had been had to the assistance of several eminent physicians, without benefit, he came under Dr. Rollo's care, in the beginning of January 1797.

Nearly the same plan of treatment, particularly with respect to the diet of animal food, was here directed, as in the case of Captain Meredith.

dith. In a very short time, a remarkable change for the better was produced. His thirst was diminished, and his urine rarely exceeded two, three, or at the utmost four points, in twenty-four hours, being at the same time of the natural sensible qualities. In this way he continued to the end of February, gradually recovering flesh and strength. He now resolved on returning to his residence at Portsmouth. He had very great impatience under restriction. But on parting from Dr. Rollo, he was told, that, for preventing the return of his disease, every thing depended on himself; and he acknowledged the truth of the observation.

He bore his journey very well, and arrived at Portsmouth on the 27th of February. But having eaten some vegetables on the road the day before, he was attacked with a bowel-complaint. On the 6th of March he had a return of his bowel-complaint, from eating beet-root. On the 9th he had the sanction of a physician to eat what he pleased, and to drink wine. The disease was soon reproduced, for his urine became sweet, and was increased in quantity, with a return of thirst and feverishness. Yet this case, Dr. Rollo justly observes, adds strength to the conclusions derived from the former case.

From the two cases Dr. Rollo draws some general inferences. He concludes,

1. That the diabetes mellitus is a disease of

the stomach, proceeding from some morbid changes in the natural powers of digestion and assimilation.

2. That the kidneys and other parts of the system, as the head and skin, are affected secondarily, and generally by sympathy, as well as by a peculiar stimulus.
3. That the stomach affection consists in an increased action and secretion, with vitiation of the gastric fluid, and, probably, on too active a state of the lacteal absorbents.
4. That the cure of the disease is accomplished by regimen, and medicines preventing the formation of sugar, and diminishing the increased action of the stomach.
5. That confinement, an entire abstinence from every species of vegetable matter, a diet solely of animal food, with emetics, hepatised ammonia, and narcotics, comprehend the principal means to be employed.
6. That the success of the treatment in a great measure establishes the five preceding inferences.
7. That the saccharine matter of the disease is formed in the stomach, and chiefly from vegetable matter, as has been shewn by the immediate effects produced by the absti-

abstinence from vegetable matter, and the use of animal food solely.

8. That accefcency is predominant in diabetic ftomachs, which continues even fome time after the entire abftinence from vegetable matter, and after the formation of fugar ; and that while fuch accefcency remains, the difpofition to the difeafe may be fupposed to continue.
9. That the faccharine matter may be removed in three days, and, by avoiding vegetable matter, will not again be reproduced ; but we are not yet able to ftate accurately, when the difeafe, and the difpofition to it, can be finally removed.
10. That there are two circumftances to be confidered in this difeafe, which we may feparate in the progrefs of the treatment. As it has been fhewn, that though the formation of fugar was prevented, yet the increafed action of the ftomach remained, and maintained the defect of affimilation, which prevented nutrition. Hence two objects occur in the cure ; for it is not yet determined, whether the preventing the formation of fugar, by an entire abftinence from vegetable matter, and the ufe of animal food, with fats, if properly perfevered in, might not

ultimately comprehend the other, namely, the removal of the morbid action of the stomach.

11. That the lungs and skin have no connection with the production of the disease.
 12. That the quantity of urine is probably in proportion to the quantity of fluids taken in, and has but little dependence on absorption of fluids, from the surface of either skin or lungs.
 13. That though the disease has been shewn to consist in an increased morbid action of the stomach, and probably too great a secretion, with vitiation of the gastric fluid; yet the peculiar or specific condition of either, as forming the disease, is acknowledged to lie in obscurity, and must remain so till the physiology of healthful digestion be properly explained and established.
 14. That the first case had only been of about seven or eight months duration when the treatment commenced; but the second case had been upwards of three years continuance. The age of the one was thirty-four; of the other, fifty-seven; circumstances which constituted material differences, though they seemed not to create corresponding difficulties in the treatment,
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so far as the direct removal of the complaint was concerned. They may however retard, in the one instance, the entire restoration of health.

15. That, in both cases, deviations occurred in the management, and were respectively followed by reproductions of the disease, and, though disadvantageous to the patients, have confirmed our views of its nature and treatment.
16. And, lastly, that from both cases we may warrant this general conclusion, that the diabetes mellitus is so far understood as to be successfully cured*.

* Vide Dr. Rollo's admirable work on Diabetes, in two volumes, 2d edition; which proves how considerable an advance may be made in an obscure disease, by the persevering industry of a philosophic practitioner.

PRACTICAL OBSERVATIONS.

SECT. LXVI.

CHÓLERA* MORBUS.

THE Cholera Morbus may very properly be considered under the head of those diseases which depend on the increased secretion of bile. It takes place, with different degrees of violence, in different habits: in some it is so acute as to prove fatal in a few hours, while in others it is expressed only by a slight purgative and emetic operation. In general the symptoms are as follow:

The patient is seized

1. With a violent discharge of a dark coloured fluid, in large quantity, and some what of a bitter taste, both from the stomach and intestines.
2. With much pain and anxiety about the *præcordia*,
3. Together with cramps or spasms, particularly of the lower extremities.

* From *χολη*, bile, and *ροη*, a flux.

4. There is a considerable degree of thirst.
5. The pulse is extremely quick and weak.
When the disease proves fatal, the pulse intermits and becomes more feeble, the extremities become cold, the patient is seized with hiccup, and dies in the same manner as persons do from inflammation of the bowels.

This disease is most prevalent in this country, in the months of August and September, so as to be considered as an autumnal epidemic. It frequently takes place spontaneously, and independently of any sensible occasional cause being applied; at other times it is evidently connected with a sudden change of temperature in those months.

It may likewise arise from the intemperate use of food of difficult digestion, and unripe fruits. In the autumn, the hepatic system is more irritable in this country than at any other season: and the diseases, which prevail in the months of August and September, are obviously connected with the state of the biliary secretion, and approach in their nature to such as prevail in warm climates.

The fluid discharged in the *Cholera Morbus* is evidently bilious, but it is bile in a *very diseased state*, by no means corresponding with the character of the natural or healthy state of that fluid.

PRACTICAL OBSERVATIONS.

SECT. LXVII.

ICTERUS*, OR JAUNDICE.

IF, after bile is secreted, its free admission into the duodenum be impeded, so that an accumulation of it take place in the excretory ducts of the liver; it either regurgitates into the habit by the hepatic veins, or is absorbed by the lymphatic system; in either case it produces the disease called jaundice; the history and cure of which I shall now endeavour to explain.

This is a disease to which women are more subject than men, and adults than children; though it takes place occasionally in persons of all ages and of both sexes. It is attended

1. With a sense of lassitude and languor.
2. A sense of pain and tension, or weight and oppression about the præcordia.
3. There is frequently much anxiety, and
4. Some degree of difficulty in breathing.

* From *ictēros*, the name of a bird, whose plumage is yellow.

5. The eyes and roots of the nails first become yellow.
6. Afterwards the whole body, which is also sometimes attended with an itching of the skin. — The disease is often accompanied
7. With nausea.
8. Vomiting.
9. Flatulency.
10. Acidity.
11. Indigestion; and,
12. The fæces, which are commonly of a white colour, have not the usual fæculent smell.
13. Solid food generally tastes bitter in the mouth in some, and
14. In the most unfavourable state of the disease there occurs hiccup, and
15. Occasional paroxysms of rigor, or chilliness.
16. The pain is sometimes extremely acute in the right hypochondrium, or in the epigastrium.
17. The state of the pulse varies; in general it is quicker than natural, though in some cases, especially during the passage of a gall-stone, it is slower.
18. It is said to have happened, that objects appear to the patient of a yellow colour.

This disease is frequent during pregnancy, and in early infancy; in both, however, it is of a very short duration.

Its decline is marked by a gradual diminution
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of the sense of weight, oppression, or uneasiness about the præcordia; a return of appetite and digestion; the colour of the urine becomes more diluted; it is secreted in a larger quantity; the stools acquire a yellow colour, are more copious, and more easily procured; sometimes hard and concrete matter is found in the fæces.

It is a disease into which a patient is very liable to relapse. It is very unfavourable if the pain be violent, and attended with a quick pulse, loss both of strength and flesh, with occasional chilliness, watchfulness, and melancholy; under those circumstances, he becomes subject either to profuse sweating or hæmorrhagy. When these symptoms attend it, the disease frequently terminates in a confirmed ascites.

Under such circumstances we may conclude, that though some bile must be secreted, and that its regurgitation, or absorption, is the consequence of some resistance to its free ingress into the duodenum; yet that a part of the liver is, in its structure, or organization, materially diseased, a circumstance which, though frequently attendant on jaundice, is by no means necessary to constitute the disease.

On dissection, various appearances present themselves to our notice. The brain, the bones, and even the cartilages, are found deeply tinged of a yellow colour. The pori biliarii, and some of the larger branches of the hepatic ducts, are found

found sometimes obliterated by diseased structure. Gall-stones are often found in the ductus communis, but more frequently in the gall bladder and cystic duct. In some a thickening and diseased structure of the ductus communis has taken place, not unlike what has been observed in the œsophagus. In many cases there have been appearances of mechanical pressure from the distention and tumour of surrounding and neighbouring parts, as of the pancreas, duodenum, and colon, either of a temporary or permanent nature; hence a jaundice may arise from pressure during pregnancy. The bile has been found of a very viscid, and pitchy consistence, especially in the gall bladder, passing from the cystic to the common duct, and thereby perhaps resisting the passage of the more fluid hepatic bile, which would otherwise flow freely into the duodenum.

PRACTICAL OBSERVATIONS.

SECT. LXVIII.

CÓLICA*, COLIC, AND ILIAC PASSION†.

THE principal symptom of this disease is,

1. A pain felt in the lower belly.
2. It is seldom fixed and pungent in one part, but is a painful distention in some measure spreading over the whole of the belly; and particularly with a sense of twisting or wringing round the navel.
3. At the same time, with this pain, the navel and teguments of the belly are frequently drawn inwards, and often the muscles of the belly are spasmodically contracted, and this in separate portions, giving the appearance of a bag full of round balls.

Such pains, in a certain degree, sometimes occur in cases of diarrhœa and cholera; but these are less violent and more transitory, and are named gripings.

* From κολη, one of the large intestines.

4. It is only when more violent and permanent, and attended with costiveness, that they constitute colic.
5. This is also commonly attended with vomiting, which in many cases is frequently repeated, especially when any thing is taken down into the stomach; and in such vomitings, not only the contents of the stomach are thrown up, but also the contents of the duodenum, and therefore frequently a quantity of bile.

In some cases of colic,

1. The peristaltic motion is inverted through the whole length of the alimentary canal, in such a manner that the contents of the great guts, and therefore stercoraceous matter, is thrown up by vomiting; and the same inversion appears still more clearly from this, that what is thrown into the rectum by gylster is again thrown out by the mouth.
2. In these circumstances of inversion the disease has been named Ileus, or the Iliac Passion; and this has been supposed to be a peculiar disease distinct from colic; but to me it appears that the two diseases are owing to the same proximate cause, and have the same symptoms only in different degree.

The colic is often without any pyrexia attending it. Sometimes, however, an inflammation comes upon the part of the intestine especially affected; and this inflammation aggravates all the symptoms of the disease, being probably what brings on the most considerable inversion of the peristaltic motion; and, as the stercoraceous vomiting is what especially distinguishes the Ileus, this has been considered as always depending on an inflammation of the intestines. However I can affirm, that as there are inflammations of the intestines without stercoraceous vomiting, so I have seen instances of stercoraceous vomiting without inflammation; and there is therefore no ground for distinguishing ileus from colic, but as a higher degree of the same affection.

The symptoms of the colic, and the dissections of bodies dead of this disease, shew very clearly, that it depends upon a spasmodic constriction of a part of the intestines; and that this therefore is to be considered as the proximate cause of the disease. In some of the dissections of persons dead of this disease, an intus-susception has been remarked to have happened; but whether this be constantly the case in all the appearances of ileus, is not certainly determined.

PRACTICAL OBSERVATIONS.

SECT. LXIX.

DIARRHOEA *, OR LOOSENESS.

THIS disease is characterized,

1. By an increased evacuation by stool.

This leading and characteristic symptom is so diversified in its degree, in its causes, and in the variety of matter evacuated, that it is almost impossible to give any general history of the disease.

It is to be distinguished from dysentery, by not being contagious; by being generally without fever; and by being with the evacuation of the natural excrements, which are at least for some time retained in dysentery. The two diseases have been commonly distinguished by the gripings being more violent in the dysentery; and they are commonly less violent and less frequent in diarrhœa: but as they frequently do occur in this also, and sometimes to a considera-

* From δια through, and ρεω to flow.

ble degree, so they do not afford any proper distinction *.

A diarrhœa is to be distinguished from cholera chiefly by the difference of their causes; which in cholera is of one peculiar kind; but in diarrhœa is prodigiously diversified, as we shall see presently. It has been common to distinguish cholera by the evacuation downwards being of bilious matter, and by this being always accompanied with a vomiting of the same kind; but it does not universally apply, as a diarrhœa is sometimes attended with vomiting, and even of bilious matter.

The disease of diarrhœa, thus distinguished, is very greatly diversified; but in all cases, the frequency of stools is to be imputed to a preternatural increase of the peristaltic motion in the whole, or at least in a considerable portion of the intestinal canal. This increased action is in different degrees, is often convulsive and spasmodic, and at any rate is a *motus abnormis*: for which reason, (says Cullen,) in the methodical Nosology, I have referred it to the order of spasmi.

Upon the same ground as I consider the disease named Lientery to be an increased peristaltic

* Tenesmus is a distinguishing symptom of dysentery, but it is sometimes present in diarrhœa also; especially those diarrhœas which proceed from acrid or putrid substances in the intestines.

motion over the whole of the intestinal canal, arising from a peculiar irritability, I have considered it as merely a species of diarrhœa. The idea of a laxity of the intestinal canal being the cause either of lientery, or other species of diarrhœa, appears to me to be without foundation, except in the single case of frequent liquid stools from a palsy of the sphincter ani.

The increased action of the peristaltic motion, I consider as always the chief part of the proximate cause of diarrhœa: but the disease is further, and indeed chiefly, diversified by the different causes of this increased action; which we are now to enquire into.

The several causes of the increased action of the intestines may be referred, I think, in the first place, to two general heads.

The first is, of the diseases of certain parts of the body which, either from a consent of the intestines with these parts, or from the relation which the intestines have to the whole system, occasion an increased action of the intestines, without the transference of any stimulant matter from the primary diseased part to them.

The second head of the causes of the increased action of the intestines is of the stimuli of various kinds, which are applied directly to the intestines themselves.

That affections of other parts of the system may affect the intestines without transference or

application of any stimulant matter, we learn from hence, that the passions of the mind do in some persons excite diarrhœa.

That diseases in other parts may in like manner affect the intestines, appears from the denudation of infants frequently exciting diarrhœa. I believe that the gout often affords another instance of the same kind; and probably there are others also, though not well ascertained.

The stimuli, which may be applied to the intestines are of very various kinds; and are either,

1. Matters introduced by the mouth.
2. Matters poured into the intestines by the several excretories opening into them.
3. Matters poured from certain preternatural openings made into them in certain diseases.

Of those introduced by the mouth, the first to be mentioned are the aliments commonly taken in. Too great a quantity of these taken in, often prevents their due digestion in the stomach; and by being thus sent in their crude, and probably acrid, state to the intestines, they frequently excite diarrhœa.

The same aliments, though in proper quantity, yet having too great a proportion, as frequently happens, of saline or saccharine matter along with them, prove stimulant to the intestines, and excite diarrhœa.

But

But our aliments prove especially the causes of diarrhœa, according as they, from their own nature, or from the weakness of the stomach, are disposed to undergo an undue degree of fermentation there, and thereby become stimulant to the intestines. Thus acefcent aliments are ready to produce diarrhœa; but whether from their having any directly purgative quality; or only as mixed in an over proportion with the bile, is not well determined.

Not only the acefcent, but also the putrescent disposition of the aliments, seems to occasion a diarrhœa: and it appears that even the effluvia of putrid bodies, taken in any way in large quantity, have the same effect.

Are oils or fats, taken in as part of our aliments, ever the cause of diarrhœa? and if so, in what manner do they operate?

The other matters introduced by the mouth, which may be causes of diarrhœa, are those thrown in either as medicines, or poisons that have the faculty of stimulating the alimentary canal. Thus, in the list of the *Materia Medica*, we have a long catalogue of those named purgatives; and in the list of poisons, we have many possessed of the same quality. The former given in a certain quantity, occasion a temporary diarrhœa; and given in very large doses, may

* Rancid oils and fats certainly irritate the intestines, and may therefore produce Diarrhœa from their oxygen.

occasion it in excess, and continue it longer than usual, producing that species of diarrhœa named a Hypercatharsis.

The matters poured into the cavity of the intestines from the excretories opening into them, and which may occasion diarrhœa, are either those from the pancreatic or biliary duct, or those from the excretories in the coats of the intestines themselves.

What changes may happen to the pancreatic juice, I do not exactly know; but I suppose that an acrid fluid may issue from the pancreas, even while still entire in its structure; but more especially when it is in a suppurated, scirrhus, or cancerous state, that a very acrid matter may be poured out by the pancreatic duct, and occasion diarrhœa.

We know well, that from the biliary duct the bile may be poured out in greater quantity than usual; and there is little doubt of its being also sometimes poured out of a more than ordinary acrid quality. It is very probable, that in both ways the bile is frequently a cause of diarrhœa.

Though I have said above that diarrhœa may be commonly distinguished from cholera, I must admit here, that as the causes producing that state of the bile which occasions cholera, may occur in all the different possible degrees of force, so as, on one occasion, to produce the most violent

lent and distinctly marked cholera; but, upon another, to produce only the gentlest diarrhœa; which, however, will be the same disease, only varying in degree. So I think it probable, that in warm climates, and in warm seasons, a *diarrhœa biliosa* of this kind may frequent occur, not to be always certainly distinguished from cholera.

However this may be, it is sufficiently probable, that, in some cases, the bile, without having been acted upon by the heat of the climate or season, may be redundant and acrid, and prove therefore a particular cause of diarrhœa.

Beside bile from the several causes and in the conditions mentioned, the biliary duct may pour out pus, or other matter, from abscesses in the liver, which may be the cause of diarrhœa.

Practical writers take notice of diarrhœa wherein a thin and bloody liquid is discharged, which they suppose to have proceeded from the liver, and have therefore given the disease the name of *Hepatirrhœa**; but we have not met with any instance of this kind; and therefore cannot properly say any thing concerning it.

A second set of excretories, from which matter is poured into the cavity of the intestines, are those from the coats of the intestines themselves; and are either the exhalants proceeding directly from the extremities of the arteries, or the ex-

* From *ἥπαρ*, the liver, and *ρῆω*, to flow.

cretories from the mucus follicles: and both these sources occur in prodigious number over the internal surface of the whole intestinal canal. It is probable that it is chiefly the effusion from these which, in most instances, gives the matter of the liquid stools occurring in diarrhœa.

The matter from both sources may be poured out in larger quantity than usual, merely by the increased action of the intestines, whether that be excited by the passions of the mind, by diseases in other parts of the system, or by the various stimulants mentioned; or the quantity of matter poured out may be increased, not so much by the increased action of the intestines, as by an increased afflux of fluids from other parts of the system.

Thus, cold applied to the surface of the body, and suppressed perspiration, may determine a greater quantity of fluids to the intestines.

Thus, in the *ischuria* renalis*, the urine taken into the blood-vessels is sometimes determined to pass off again by the intestines.

In like manner, pus or serum may be absorbed from the cavities in which they have been stagnant, and be again poured out into the intestines, as frequently happens, in particular with respect to the water of dropsy.

It is to be observed here, that a diarrhœa may be excited not only by a copious afflux

* From *ισχυα*, to restrain, and *ουρον*, the urine.

of the system, but likewise by the mere determination of various acrid matters from the mass of blood into the cavity of the intestines. Thus it is supposed that the morbid matter of fevers is sometimes thrown out into the cavity of the intestines, and gives a critical diarrhœa; and whether I do, or do not, admit the doctrine of critical evacuations, I think it is probable that the morbid matter of the exanthemata is frequently thrown upon the intestines, and occasions diarrhœa.

It is to me further probable, that the putrescent matter diffused over the mass of blood in putrid diseases, is frequently poured out by the exhalants into the intestines, and proves there the cause, at least in part, of the diarrhœa so commonly attending these diseases.

Upon this subject of the matter poured into the cavity of the intestines, I have chiefly considered them as poured out in unusual quantity: but it is probable that, for the most part, they are also changed in their quality, and become of a more acrid and stimulant nature, upon which account especially it is that they excite, or at least increase a diarrhœa.

How far, and in what manner, the exhalant fluid may be changed in its nature and quality, we do not certainly know: but with respect to the fluid from the mucous excretories, we know that, when poured out in unusual quantity, it is commonly, at the same time, in a more liquid

quid and acrid form ; and may prove therefore, considerably irritating.

Though the copious effusion of a more liquid and acrid matter from the mucous excretories, be probably owing to the matter being poured out immediately as it is secreted from the blood into the mucous follicles, without being allowed to stagnate in the latter, so as to acquire that milder quality and thicker consistence we commonly find in the mucus in its natural state ; and although we might suppose the excretions of a thin and acrid fluid should always be the effect of every determination to the mucous follicles, and of every stimulant applied to them : yet it is certain, that the reverse is sometimes the case ; and that, from the mucous follicles, there is frequently an increased excretion of a mucus, which appears in its proper form of a mild, viscid, and thickish matter. This commonly occurs in the case of dysentery ; and it has been observed to give a species of diarrhœa, which has been properly named the *Diarrhœa Mucosa*.

A third source of matter poured into the cavity of the intestines, and occasioning diarrhœa, is from those preternatural openings produced by diseases in the intestines or neighbouring parts. Thus the blood-vessels on the internal surface of the intestines may be opened by erosion, rupture, or anastomosis, and pour into the cavity their blood,

blood, which, either by its quantity or by its acrimony, whether inherent or acquired by stagnation, may sometimes give a diarrhœa evacuating bloody matter. This is what I think happens in that disease which has been called the *Melæna** or *Morbus Niger*.

Another preternatural source of matter poured into the cavity of the intestines, is the rupture of abscesses seated either in the coats of the intestines themselves, or in any of the contiguous viscera, which, during an inflamed state, had formed an adhesion with some part of the intestines. The matter thus poured into their cavity may be various; purulent, or sanious, or both together, mixed at the same time with more or less of blood; and in each of these states may be a cause of diarrhœa.

Amongst the stimuli that may be directly applied to the intestines, and which, by increasing their peristaltic motion, may occasion diarrhœa, I must not omit to mention worms, as having frequently that effect.

I must also mention here a state of the intestines, wherein their peristaltic motion is preternaturally increased, and a diarrhœa produced; and that is, when they are affected with an erythematic inflammation. With respect to the existence of such a state, and its occasioning

* From *μελας*, black.

diarrhœa, see what is said above. Whether it is to be considered as a particular and distinct case of diarrhœa, or is always the same with some of those produced by one or other of the causes before mentioned, I have not been able to determine.

Lastly, by an accumulation of alimentary or of other matter poured into the cavity of the intestines from several of the sources above mentioned, a diarrhœa may be especially occasioned when the absorption of the lacteals, or of other absorbents, is prevented, either by an obstruction of their orifices, or by an obstruction of the mesenteric glands, through which alone the absorbed fluids can be transmitted.

In one instance of this kind, when the chyle prepared in the stomach and duodenum is not absorbed in the course of the intestines, but passes off in considerable quantity by the anus, the disease has been named *Morbus Cœliacus*, or simply and more properly *Cœliaca**; which accordingly I have considered as a species of diarrhœa.

I have thus endeavoured to point out the various species of disease that may come under the general appellation of Diarrhœa; and from that enumeration it will appear, that

* *Cœliac* passion, from *κεκλιμα*, the belly.

many, and indeed the greater part of the cases of diarrhœa, are to be considered as sympathetic affections, and to be cured only by curing the primary disease upon which they depend.

PRACTICAL OBSERVATIONS,

SECT. LXX.

VERMES, WORMS.

It is a fact equally well known to physicians and philosophers, that the human body contains in its interior different species of worms. These worms are also known to produce diseased states of the bodies in which they inhabit, and to become the source of innumerable evils.

The usual symptoms are,

1. Disturbed sleep with startings.
2. Gnashing, or grinding of the teeth.
3. Breath exceedingly offensive in the morning.
4. Pains in the bowels, and stomach.
5. Itching of the nose, and other parts.
6. Wasting of the flesh.
7. Often hectic fever, or tabes.
8. Voiding of mucous stools, and worms of different kinds.

To inquire therefore into their anatomy and economy, and to point out their peculiarities, is a
matter

matter of no small importance, but, ~~on~~ the contrary, may contribute to establish a more rational method of cure in diseases produced by these creatures. The descriptions of writers on this subject are frequently discordant, and we have yet to lament the want of an arrangement which shall distinctly point out the specific characters by which each worm may be distinguished. To obviate these inconveniences, and to reduce to order what has hitherto been much confused, I have, says the learned Dr. Hooper, in the following sheets, endeavoured to lay down some observations towards establishing an arrangement of human intestinal worms. It is my intention also, at some future period, to prove, that the human intestinal worms are of themselves distinct from all other worms, and only inhabit in the human *primæ viæ*.

Such is the nature and office of the human stomach and intestines, that insects, or their uvula, may not unfrequently be conveyed into that canal with those things that are continually taken as food; but such insects or worms do not live long, and seldom, if ever, generate in a situation so widely different from their natural one.

Besides these, there are worms that are never found in any other situation than the human stomach or intestines, and which there generate and produce their species.

Thus it appears that the human stomach and
intestines

intestines ~~are~~ the seat for animalculæ, which are translated from their natural situation, and also for worms proper to them, which live in no other situation, as I shall prove in the description of each species.

THE FIRST CLASS

Contains those worms which are generated and nourished in the human intestinal canal, and which there propagate their species.

THE SECOND CLASS

Comprehends those insects or worms, that accidentally enter the human primæ viæ *ab extra*, and which never propagate their species in that canal, but are soon eliminated from the body; such are several species of Scarabæ, the Lumbricus Terrestris, the Fasciola, the Gordius Intestinalis, and others.

The second class belongs to the province of natural history. The consideration of the first class is the subject of the present paper, which, from the variety it affords, I have thought proper to divide into different orders, genera, and species, and have attached such peculiarities as, eventually, will distinguish them from all others.

ORDER I. GENUS I.

SPECIES 1.

ASCARIS LUMBRICÓIDES.

Essential Character.—The body round. Length from twelve to fifteen inches. Head furnished with three vesicles, forming in their middle a triangular space.

Situation.—They generally infest the small intestines, and of these more frequently the course of the jejunum and ileum. Sometimes they are known to ascend through the duodenum into the stomach, and I have frequently seen them creep out at the mouth and nostrils. It happens but rarely, that they descend into the tract of the large intestines, and then only after the exhibition of vermifuges, or from other causes, which increase the peristaltic motion. They have also been detected *post mortem* in the ductus communis cholidochus; and instances are related where they have remained a considerable time in the vesica fellea*.

Number.—In general they are very numerous; I knew a girl eight years old, who voided per

* There is a preparation illustrative of this fact in the invaluable Anatomical Museum of Mr. Heaviside, a collection that confers the highest honour on the nation, as well as the individual. The greatest part of the worm is convoluted within the gall-bladder, and a portion of the tail fills the ductus cysticus.

anum upwards of two hundred in the course of a week ; between thirty and fifty is a very common number. Nevertheless instances frequently occur of their being solitary.

Colour.—When recently excluded they are transparent, and appear as if they had been sucking water tinged with blood ; this colour, however, soon disappears, and they become at length of a light and opaque yellow.

Motion.—When voided by patients they are, in general, very feeble, and soon die in spite of all attempts to keep them alive. I have, however, occasionally succeeded by suddenly evacuating them by a very drastic purge, and immediately putting them into warm milk and water, when they appear extremely vivacious. Their motion is serpentine, and in no respect resembles that of the lumbricus terrestris, or earth worm, which has the power of considerably diminishing its length and again extending itself. Whereas that of the lumbricoid ascaris is never diminished, the head is always sent forward by the worm curling itself into circles, and suddenly extending it with considerable force to some distance.

Refutation of this Worm being (as is by many supposed) the Earth or Lob-Worm, Lumbricus Terrestris Linnaei.

The long round worm of the human intestines has, for many centuries, been considered of the same

same species as the earth or lob-worm; the fallacy of which I have therefore thought proper to demonstrate.

The lumbricus terrestris has but one vesicle at its head, in the middle of which is its mouth; it is flat towards the tail, and is furnished with sharp bristles on its under surface, that serve it for feet, which the animal can erect or depress at pleasure; its annular muscles are very large and strongly marked, and its colour is of a dusky red. Whereas the lumbricoid ascaris has none of these characteristics. I have before noticed its colour is a pale yellow, that its muscles are very delicate, and its head furnished with three vesicles. Upon the under surface of the earth-worm there is a large semilunar fold in the skin, into which the animal can draw its head, or thrust it out at will; but there is no such form in the ascaris lumbricoides: the former also has an elevated belt in its middle, but in the latter there is a depressed band. On each side of the ascaris lumbricoides there is a longitudinal line very distinctly marked; on the earth-worm there are three lines upon its upper surface.

SPECIES 2.

ASCARIS VERMICULARIS.

Essential Character.—Head obtuse, and furnished with three vesicles. Tail terminates in a sharp point.

Situation.—They are most commonly situated in the intestinum rectum of children, and are continually passing per anum; hence they are called by the Germans, afterwurm. They are frequently met with in the cæcum and colon, and have been found in the stomach * and small intestines, lying hid between their tunics.

Number.—This species is generally in very considerable numbers, especially in the rectum of children. When they infest other parts, their numbers are less considerable, yet I have known upwards of an hundred vomited in the course of a day, from the stomach of a young woman.

Colour.—Their natural colour is a pale yellow. They are often observed of a yellowish green, and occasionally brown. This would appear to depend upon a variety of circumstances with which we are unacquainted; for, if suffered to remain a day or two in water, they always (whatever their colour may be) become of an opaque pale yellow.

Motion.—The head is the part first put into motion, which the animal turns in every direction, sometimes forming a circle, at other times the figure eight; but most frequently its tail appears fixed, whilst it turns its body sometimes to one side, and then to the other. They are extremely vivacious, and I have seen them bury themselves in the soft fæces of children almost instantaneously.

* Wolf Observat. Chirurg. Medic. l. 2. obs. 4.

upon exposure to the atmospheric air. By some they are said to jump from one place to another, but I cannot say I have ever seen them*.

GENUS II.

SPECIES I.

TRICHIURIS VULGARIS.

Essential Character.—Body large and furnished with a proboscis. Tail twice as long as the body, and filiform.

Number.—I have seen upwards of twenty in some faces of a child of six years old, and, according to the account of Blumenbach, they are, in general, in considerable number.

Situation.—Wrisberg, Blumenbach, and others, have found these worms in the intestinum rectum, in the inferior part of the ileum, and also in the jejunum, mixed with their pultaceous contents. I have never seen them after death but in the cæcum.

Colour.—Like the vermicular ascarides.

Motion.—Its motion is by no means vivacious, which would appear to arise from a want of power, as the animal died soon after exposure to air. About a minute before its death the proboscis was withdrawn, and suddenly elongated

* This circumstance appears to have given rise to the name ascarides; for ἀσκαρίζειν signifies the same as σκαρίζειν saltare, vel salire.

three or four times, when it gradually curled itself into a round shape, and was never observed to move after.

ORDER II. GENUS I.

SPECIES 1.

TENIA OSCULIS MARGINALIBUS.

Essential Character.—The oscula are situated upon the margin of each articulation, and the ovaria are disposed in an arborefcient form.

Of the Connexion of the Joints.—The joint next to the head is received into the basis of the head, and it, in like manner, receives the beginning of the next joint, which order is observed throughout the whole extent of the worm. Thus the inferior margin or joint, or that towards the tail, is called the receiving articulatory margin, to distinguish it from the other which is received. The receiving articulatory margin is supplied with a ligamentous band, to which the longitudinal muscles are attached, which firmly embraces the next joint. This margin may always be known from the other by its being largest, and by its being fringed, whereas the other is plain, and somewhat rounded.

Of the Separation of the Joints of this Worm into VERMES CUCURBITINI.—The joints of the tænia osculis marginalibus are very easily separated from each other whilst the animal is alive. This

separation is effected either by the peristaltic motion of the intestines, or, perhaps, spontaneously. Each joint thus detached from the mother-worm, has the power of retaining, for a considerable time, its living principle, and is called, from its resemblance to the seed of the gourd, *vermis cucurbitinus*. This phenomenon has given rise to many warm disputes; several authors have denied their being portions of *tæniæ*, and have affirmed that they were distinct worms; but of this hereafter. The separated joints do not appear capable of retaining their situation for any length of time, but are soon forced down the intestinal tube, and at length creep out, or are expelled *per anum*. I knew a man who had been for some time troubled with this species of *tænia*; whenever he took a strong purgative medicine, he voided upwards of thirty or forty detached joints with his *fæces*; and I remember a female patient, who was always tormented by their creeping *per anum* two or three hours after dining without the exhibition of any medicine. Such eliminations are common to all who nourish this worm.

Thus it is evident that the joints of this animal exist for a time when separated from each other. I have kept them alive, and fed them two or three days together; but I do not believe that they are capable of living any length of time in the intestines, when perfectly detached.

I am inclined to believe that the *vermes cucurbitini*

bitini have not the power of propagating the species, *i. e.* of forming fresh joints ; I conceive that property to be peculiar to the head ; but this is to be considered as mere hypothesis, cherished by the two following circumstances : First, That their expulsion always succeeds their being detached ; and, secondly, that the separation of the joints appear to be the only means of insuring the worm a continuance in its sphere ; for, were the head to continue multiplying the joints, and the joints have the same power, they would soon obliterate the cavity of the intestinal tube, and, consequently, effect their own expulsion, or kill the patient.

Of the Formation of fresh Joints.—There are several cases faithfully recorded, and several have come under my own care, where the persons, if their veracity can be depended upon (and they had no interest in deceiving), have voided, during the time they were troubled with the worm, upwards of fifteen thousand. I have attended several patients who were martyrs to the ravages of this animal for upwards of seven years, and the number of joints which, during that period, have been evacuated, are beyond all conception ; from some upwards of fifty per day, and seldom fewer than twenty.

When a specific is administered, and the whole worm or worms brought away by stool, no more portions are ever known to follow. But experience teaches, that when all is voided
except

except the head, then in a short time after, fresh joints are generated, and the patient is as much troubled with them as before.

Thus it is evident that the formation of the joints is proper to the head of the animal, and, I believe, to it alone.

Number of this Species of Tænia.—It is not, in general, solitary, as is commonly supposed; Herrenschwanz, Madame Noufer, and others, mention their seeing several come away, at the same time, from their patients.

Situation.—They are always found in the jejunum and ileum, occupying their whole extent.

Colour.—Tæniæ are mostly of a pale white, but the colour varies in different worms. They are not unfrequently of a light brown cast, which, in all probability, arises from living on the chyme, or on chyle mixed with some bile.

Motion.—The motion of tæniæ is undulatory. The first joint towards the head contracts, the succeeding ones follow successively, and the worm is at length drawn considerably forwards, exactly in the manner that the earth-worm is seen to move, but not near so rapidly. By this means the food taken in at the mouth of the worm is very soon conveyed all along the alimentary canal. I have detected milk, mixed with a colouring matter, running along this canal in the above manner with considerable rapidity.

Length.—Boerhaave mentions his meeting with
a tænia

a *tænia* thirty ells in length, and Pliny says he has seen them upwards of thirty feet long. The exact length, however, depends upon the manner in which the death of the animal was occasioned. If expelled by irritating medicines, it will not be as long by nearly one-half, as if its death had been occasioned by emollients; for, in the first instance, it would be very much contracted, but in the latter, very much relaxed.

OBSERVATIONS.—Dionis, in his treatise upon *tænia**, has called this species *tænia articulosa demittens*, in consequence of the frequency of its parting with its joints; and this circumstance has given rise to innumerable errors.

The Arabian physicians observing these detached portions come away alive, and not thinking it possible they could be joints of another worm, believed they were a distinct species, and described them accordingly.

Others, finding several of the joints articulated together, believed it to be in consequence of suction†.

Those who could not conceive how the angles and vessels could correspond so exactly, supposed they were all surrounded by a common membrane, which Van Helmont assures us has its origin from the intestinal mucus.

Linnæus arranges them amongst the polypi,

* Dissertation sur le *Tænia* ou ver plat. p. 14.

Vide Lartuſer fundam. path. tom. ii. p. 203.

and many very learned authorities appear to favour his opinion. The following is an extract from one of his letters to Baron de Haller. *Tæ-niam examinavi, et reperi 14 vivas integras, quæfivi caput quod omnes medici in lumbrico lato quæfiverunt, sed frustra; faliffimum est caput, quod Tulpus habet in observationibus; et frustra quæretur caput, nam caput est in fingulo articulo, et os in fingulo articulo, in una specie fubtus, in altera ad latus. Nullus mortalium potuerit intelligere hunc vermem, qui non intellexerit poly-porum naturam, et propagatur fecedentibus articulis, dum quilibet articulus vivit et accrefcit in perfectum corpus: inferui Upsalienfibus nunc imprimendis*.*

Some believe the lateral ofcula to be the mouths by which they take in their food, and, at the fame time, confider them as excretory veffels. Coulet † and Ernft are of this opinion, the latter expreffes himfelf thus: *Nihil ergo reflat quam ftatuere idem orificium abforptioni chyli et excretioni excrementorum infervire. Objeétio enim, quafi nulla excrementa ejicerent* ifti lumbrici, quia merum chylum ederent, nulla eft; aliàs infantes puro lacte viventes nihil excrementitii haberent; nec absurdum putes hoc ben. leét. fi idem ofculum et deglutitioni et excrementis lar-*

* Vide Linnæum in *Collect. Epiftol. ab erud. viris ad Haller.* tom. 2. p. 411.

† *Tractatus Hift. de Afcariid.* l. c.

gius. Stella enim marina unicum in superiori superficie habet orificium quo artificiose prædam arripit, devorat, et quicquid est excrementitii, per idem orificium reddit, nonne idem nostræ Tæniæ, natura diversimodo ludente, privilegium concedi potuit * ?

Bonnet appears in one part of his treatise on insects, to favour a similar opinion, although he expresses himself very differently in other places. Speaking of a species of tænia he observed with two oscula on the flattened surface, he says, “ Ces petits viscères analogues à l'estomac et aux intestines communiquent avec les stigmates ; et si le plus grand de ces stigmates fait la fonction de bouche, on presume assez que l'autre s'acquitte de l'anus †.”

The same author considers them as organs of respiration§. The arboresecent ovaria are, by those who believe the oscula to be the true mouths which convey nourishment to the worm, taken for chylopoëtic vessels, and their ovula for small glands|| or pieces of fat, or young polipi ‡.

The four suckers at the head, Andry assures us, are their eyes ** ; and Mery is willing we should

* Vide Ernst. Dissert. Inaug. de Tænia secunda Plateri.

† Vide Bonnett Traité d'Insectologie.

§ Vide Bonnett, l. c.

|| Vide System. Natur. Linnæi, tom. i. p. 1323.

‡ Vide tom. iv. des Memoires des Curieux de la Nature a Berlin, p. 218.

** Andry sur le Generation des ver. loc. cit.

consider them as the animal's nostrils*. The obtuse extremity has been taken for the head, and the true head for the tail†.

It is somewhat singular that so many accurate observers in several nations have, during many centuries, pretended that there never was but one of these *tæniæ* in the same individual, from whence arose the name *Solium*, and by the French *le ver solitaire*.

It appears to me superfluous to prove the fallacy of these and various other ridiculous opinions, and to refute them; for having, I trust, satisfactorily demonstrated, that they have heads, and the head an apparatus by means of which it absorbs the nourishment, which passes from thence to every articulation of the worm; that the oscula, and the various ramifications which are observed in the internal part of the joints, are subservient to generation, and that ovula pass from thence into the intestinal canal; and as it is sufficiently proved that these *tæniæ*, as well as other worms of our intestines, exist only in the human body, and that in society, I think all further refutation needless.

* The same book.

† Le Clerc *Hist. Lumbric. lator.* p. 165.

SPECIES 2.

TÆNIA OSCULIS SUPERFICIALIBUS.

Essential Character.—The oscula situated on the flattened surface of each joint. Ovaria disposed like a star round the osculum.

Number of this Species of Worm.—Uncertain. Seldom more than three or four; but this number is by no means unfrequent.

Length.—This species of tænia seldom exceeds five yards in length.

Situation —It is always situated in the small intestines, and it would appear that it feeds on no other food than pure chyle.

Colour.—It is for the most part of a darker hue than the former species, nevertheless I have seen it as white as milk.

OBSERVATION.—This species of tænia is very seldom met with in this country, but is endemic in Switzerland and Russia*, and very common in Germany and other parts of Europe.

It is no uncommon circumstance in the countries where this species is endemial, to have it come away before it has arrived at its full growth, and this occurring so frequently, has given rise to the name of *Tænia Tenella*, which is by many considered as a distinct species, though, in reality, no other than the worm we have just de-

* Vide Cartheuser libellus de morbis endemius.

scribed, differing from it in size only, having every thing else in common with it.

Linnaeus enumerates another species of *tænia*, which, he says, has two oscula on each joint, one placed upon each side, and which he terms *Tænia Vulgaris*. This, which at most can only be a variety, is called by Pallas, *Le Gris*, who says, it is of a white colour, and that easily changed into a griseous one by spirit of wine. As I have never had an opportunity of observing this worm, I pass it by—probably it is only met with in Switzerland*.

* Words cannot convey any idea to the reader of the excellence of the plates of these worms, as described by Dr. Hooper, and as such we recommend them to the public. Vide *Transactions of the Bolt Court Medical Society*, Vol. V. page (224). Happy would it be for science, if abstruse medical enquiries were often taken up with an equal zeal and ability!

PRACTICAL OBSERVATIONS.

SECT. LXII.

CÓLICA PICTORUM*; OR, DEVONSHIRE COLIC.

THIS disorder arises from lead, somehow or other received into the body. The salt of lead has a saccharine taste, which has procured it the name also of sugar of lead. For this reason when wine begins to turn sour, the ready way to cure it of that disagreeable taste is, to substitute a sweet one which is not disagreeable to the taste, by mixing therewith ceruse, litharge, or some such preparations of lead: for the acid of the wine dissolves the lead, and therewith forms a sugar of lead, which remains mixed with the wine, and hath a taste, which, joined with that of the wine, is not unpleasant. But, as lead is one of the most dangerous poisons we know, this method ought never to be practised; and whoever employs such a pernicious drug deserves to be most severely punished. Yet some-

* From the Latin word *pictor*, a painter.

thing very like this happens every day, and must needs have very bad consequences; while there is nobody to blame, and those to whom the thing may prove fatal can have no mistrust of it.

All the retailers of wine in Paris, have a custom of filling their bottles on a counter covered with lead, having a hole in the middle, into which a leaden pipe is foldered. The wine which they spill on the counter, in filling the bottles, runs through this pipe into a leaden vessel below. In that it usually stands the whole day, or perhaps several days; after which it is taken out of the leaden vessel, and mixed with other wine, or put into the bottle of some petty customer. But, alas for the man to whose lot such liquor falls! He must feel the most fatal effects from it; and the danger to which he is exposed is so much the greater the longer the wine hath stood in the leaden vessel, and thereby acquired more of a noxious quality. We daily see cruel distempers among the common people, occasioned by such causes, which are not sufficiently attended to.

Wine that is not kept in close vessels is apt to turn sour very soon, especially in the summer; and the retailers of wine have observed that their drippings, thus collected in vessels of lead, are not liable to this inconvenience. This is what hath established among them the practice I am speaking against. As they see only the good effects

fects thereof, and know nothing of its ill consequences, we cannot, however, be much angry with them. It is natural to think, that, as lead hath the property of keeping wine cool, it may by that means prevent its growing sour for some time; and persons who are not versed in chymistry can hardly suspect that wine is preserved from being pricked, only by being converted into a kind of poison. Yet this is the very case: for lead doth not hinder the wine from growing sour; but, uniting with its acid, as soon as it appears, and forming therewith a sugar of lead, changes the taste thereof as hath been said, and hinders the acid from affecting the palate.

It is easy to prove whether or no a suspected wine contains lead. You need only pour into it a little oil of tartar per deliquium; or, if you have not that at hand, a lye of the ashes of green wood. If there be any lead dissolved in it, the liquor will immediately grow turbid, and the lead will precipitate in the form of a white powder; because the sugar of lead it contains, being a neutral salt, whose basis is a metal, is decomposed by the fixed alkali, which separates that metal from the acid. Lead thus separated from the acid of vinegar by an alkali, is called magistery of lead.

Ceruse, or white lead, is also a very dangerous poison. It is a pigment very much used, being the only white that can be applied with oil.

This

This white is the most common, or, perhaps, the only cause of those dreadful colics with which painters, and all that work in colours, are frequently afflicted.

To the same cause, though not so apparent at first sight, we are to ascribe the Devonshire colic, where lead is received into the body dissolved in cyder, the common drink of the inhabitants of that country. This has been proved by experiment, for lead has been extracted from cyder in quantity sufficient to produce pernicious effects on the human body. The colic of Poitou, and what is called the dry belly-ache in the West Indies, are of the same nature; the following are the symptoms of all these diseases:

1. The patient is generally first seized with an acute pain at the pit of the stomach, which extends itself down with griping pains to the bowels.
2. Soon after there is a distension, as with wind; and frequent reachings to vomit, without bringing up any thing but small quantities of bile and phlegm.
3. An obstinate costiveness follows, yet sometimes attended with a tenesmus, and the bowels seem to the patient as if they were drawn up towards the back; at other times they are drawn into hard lumps, or hard rolls, which are plainly perceptible to the hand on the belly, by strong convulsive spasms.

4. Sometimes the coats of the intestines seem to be drawn up from the anus and down from the pylorus towards the navel.
5. When a stool is procured by artificial means, as clysters, &c. the fæces appear in little hard knots like sheep's dung, called scybalæ, and are in small quantity.
6. The urine is discharged in small quantity, frequently with pain and much difficulty.
7. The pulse is generally low, though sometimes a little quickened by the violence of the pain; but inflammatory symptoms seldom or never occur.
8. The extremities are often cold, and sometimes the violence of the pain causes cold clammy sweats and fainting.
9. The mind is generally much affected, and the spirits are sunk.

The disease is often tedious, especially if improperly treated, insomuch that the patients will continue in this miserable state for twenty or thirty days successively; nay, instances have been known of its continuing for six months. In this case the pains at last become almost intolerable: the patient's breath acquires a strong fetid smell like excrements, from a retention of the feces, and an absorption of the putrid effluvia from them by the lacteals. At last, when the pain in the bowels begins to abate, a pain comes on in the shoulder-joints

joints and adjoining muscles, with an unusual sensation and tingling along the spinal marrow. This soon extends itself from thence to the nerves of the arms and legs, which become weak; and that weakness increases till the extreme parts become paralytic, with a total loss of motion, though a benumbed sensation often remains. Sometimes, by a sudden metastasis, the brain becomes affected, a stupor and delirium come on, and the nervous system is irritated to such a degree as to produce general convulsions, which are frequently followed by death. At other times, the peristaltic motion of the intestines is inverted, and a true iliac passion is produced, which also proves fatal in a short time. Sometimes the paralytic affection of the extremities goes off, and the pain of the bowels returns with its former violence, and on the cessation of the pain in the intestines, the extremities again become paralytic, and thus the pain and palsy will alternate for a very long time.

PRACTICAL OBSERVATIONS

SECT. LXXI.

SPASMI*

SPASMI* INTESTINORUM—SPASMS OF THE
INTESTINES

SYMPTOMS.

1. A rumbling noise in the intestines, like the washing of a barrel.
2. Frequent and changeable pain in the region of the abdomen.
- 3 The countenance usually very fallow, and the patient subject to the hysteric ball, and oftentimes to hysteric fits.

* From *σπᾶω*, to contract

PRACTICAL OBSERVATIONS.

SECT. LXXII.

TYMPANITES*, OR, TYMPANY.

THE tympanites is,

1. A swelling of the abdomen; in which the teguments appear to be much stretched by some distending power within, and equally stretched in every posture of the body.
2. The swelling does not readily yield to any pressure: and in so far as it does, very quickly recovers its former state upon the pressure being removed.
3. Being struck, it gives a sound like a drum, or other stretched animal membranes.
4. No fluctuation within is to be perceived; and the whole feels less weighty than might be expected from its bulk.
5. The uneasiness of the distention is commonly relieved by the discharge of air from the alimentary canal, either upwards or downwards.

* From *τυμπανον*, a drum.

These are the characters by which the tympanites may be distinguished from the ascites; and many experiments show, that the tympanites always depends upon a preternatural collection of air, somewhere within the teguments of the abdomen: but the seat of the air is in different cases somewhat different; and this produces the different species of the disease.

One species is, when the air collected is entirely confined within the cavity of the alimentary canal, and chiefly in that of the intestines. This species, therefore, is named the Tympanites intestinalis, Sauv. sp. 1. It is, of all others, the most common; and to it especially belong the characters given above.

A second species is, when the air is collected in the sac of the peritonæum, or what is commonly called the cavity of the abdomen, that is, the space between the peritoneum and viscera; and then the disease is named Tympanites abdominalis, Sauv. sp. 2. The existence of such a tympanites, without any tympanites intestinalis, has been disputed; and it certainly has been a rare occurrence: but from several dissections, it is unquestionable that such a disease has sometimes truly occurred.

The tumour of the belly sometimes grows very quickly to a considerable degree, and seldom in the slow manner the ascites commonly comes on. In some cases, however, the tympanites

rites comes on gradually, and is introduced by an unusual flatulency of the stomach and intestines, with frequent borborygmi, and an uncommonly frequent expulsion of air upwards and downwards. This state is also frequently attended with colic pains, especially felt about the navel, and upon the sides towards the back ; but generally as the disease advances, these pains become less considerable. As the disease advances, there is a pretty constant desire to discharge air, but it is accomplished with difficulty ; and when obtained, although it gives some relief from the sense of distention, this relief is commonly transient and of short duration. While the disease is coming on, some inequality of tumor and tension may be perceived in different parts of the belly ; but the distention soon becomes equal over the whole, and exhibits the phenomena mentioned in the character. Upon the first coming on of the disease, as well as during its progress,

6. The belly is bound, and the feces discharged are commonly hard and dry.

7. The urine, at the beginning, is usually very little changed in quantity or quality from its natural state : but as the disease continues, it is commonly changed in both respects ; and at length sometimes a stranguary, and even an ischuria, comes on.

8. The

8. The disease has seldom advanced far before the appetite is much impaired, and digestion ill performed; and the whole body, except the belly, becomes considerably emaciated.
9. Together with these symptoms, a thirst and uneasy sense of heat at length comes on, and a considerable frequency of pulse occurs, which continues throughout the course of the disease.
10. When the tumor of the belly arises to a considerable bulk, the breathing becomes very difficult, with a frequent dry cough.

With all these symptoms the strength of the patient declines; and the febrile symptoms daily increasing, death at length ensues, sometimes probably in consequence of a gangrene coming upon the intestines.

PRACTICAL OBSERVATIONS.

SECT. LXXIII.

ASCITES*, DROPSY OF THE BELLY.

THE name of Ascites is given to every collection of waters causing a general swelling and distention of the lower belly; and such collections are more frequent than those which happen in the thorax.

The collections in the lower belly, like those of the thorax, are found in different situations. Most commonly they are in the sac of the peritonæum, or general cavity of the abdomen: but they often begin by sacs formed upon, and connected with, one or other of the viscera; and perhaps the most frequent instances of this kind occur in the ovaria of females. Sometimes the water of ascites is found entirely without the peritonæum, and between this and the abdominal muscles,

From *ασκος*, a sack.

These

These collections connected with particular viscera, and those formed without the peritonæum, form that disease which authors have termed the encysted dropfy, or hydrops faccatus. Their precise seat, and even their existence, is very often difficult to be ascertained. They are generally formed by collections of hydatides.

In the most ordinary case, that of abdominal dropfy,

1. The swelling at first is in some measure over the whole belly, but generally appears most considerable in the epigastrium.
2. As the disease, however, advances, the swelling becomes more uniform over the whole abdomen.
3. The distension and sense of weight, though considerable, vary a little according as the posture of the body is changed; the weight being felt the most upon the side on which the patient lies, while at the same time on the opposite side the distension becomes somewhat less.
4. In almost all the instances of ascites, the fluctuation of the water within may be perceived by the practitioner's feeling, and sometimes by his hearing.

This perception of fluctuation does not certainly distinguish the different states of dropfy; but serves very well to distinguish dropfy from

tympanites, and from the state of pregnancy in women.

An ascites frequently occurs when no other species of dropfy does at the same time appear; but sometimes the ascites is a part only of universal dropfy. In this case, it usually comes on in consequence of an anasarca, gradually increasing; but its being joined with anasarca, does not always denote any general diathesis, as for the most part an ascites sooner or later occasions œdematous swellings of the lower extremities.

When the collection of water in the abdomen, from whatever cause, becomes considerable, it is always attended with a difficulty of breathing; but this symptom occurs often when, at the same time, there is no water in the thorax. The ascites is sometimes unaccompanied with any fever; but frequently there is more or less of fever present with it. The disease is never considerable without being attended with thirst and a scarcity of urine.

In the diagnosis of ascites, the greatest difficulty that occurs, is in discerning when the water is in the cavity of the abdomen, or when it is in the different states of encysted dropfy above mentioned. There is, perhaps, no certain means of ascertaining this in all cases; but in many we may attempt to form some judgment with regard to it.

When

When the antecedent circumstances give suspicion of a general hydropic diathesis; when at the same time some degree of dropsy appears in other parts of the body; and, when, from its first appearance, the swelling has been equally over the whole belly, we may generally presume that the water is in the cavity of the abdomen. But when an ascites has not been preceded by any remarkable cachectic state of the system, and when at its beginning the tumour and tension had appeared in one part of the belly more than another, there is reason to suspect an encysted dropsy. Even when the tension and tumour of the belly have become general and uniform over the whole; yet if the system of the body in general appear to be little affected; if the patient's strength be little impaired; if the appetite continue pretty entire, and the natural sleep be little interrupted; if there be yet no anasarca; or, though it may have already taken place, if it be still confined to the lower extremities, and there be no leucophlegmatic paleness or fallow colour in the countenance; if there be no fever, nor so much thirst, or scarcity of urine, as occur in a more general affection; then, according as more of these different circumstances take place, there will be the stronger ground for supposing the ascites to be of the encysted kind.

The chief exception to be made from this as a general rule, will, in my opinion, be when the ascites may, with much probability, be presumed to have come on in consequence of a scirrhus liver; which, I apprehend, may occasion a collection of water in the cavity of the abdomen, while the general system of the body may not be otherwise much affected.

PRACTICAL OBSERVATIONS.

SECT. LXXIV.

ANASARCA*, OR DROPY OF THE LEGS.

WE descend now in order to the extremities.
The Anasarca is,

1. A swelling upon the surface of the body, at first commonly appearing in particular parts only, but at length frequently appearing over the whole.
2. So far as it extends, it is an uniform swelling over the whole member, at first always soft, and readily receiving the pressure of the finger, which forms a hollow that remains for some little time after the pressure is removed, but at length rises again to its former fulness.
3. This swelling generally appears, first, upon the lower extremities; and there too only in the evening, disappearing again in the morning.

* From *ανα*, along, and *σαρξ*, the flesh.

4. It is usually more considerable as the person has been more in an erect posture during the day; but there are many instances of the exercise of walking preventing altogether its otherwise usual coming on.
5. Although this swelling appears at first only upon the feet and about the ankles; yet if the causes producing it continue to act, it gradually extends upwards, occupying the legs, thighs, and trunk of the body, and sometimes even the head.
6. Commonly the swelling of the lower extremities diminishes during the night; and in the morning, the swelling of the face is most considerable, which again generally disappears almost entirely in the course of the day.

An anasarca is evidently a preternatural collection of serous fluid in the cellular texture immediately under the skin. Sometimes pervading the skin itself, it oozes out through the pores of the cuticle; and sometimes, too gross to pass by these, it raises the cuticle in blisters. Sometimes the skin, not allowing the water to pervade it, is compressed and hardened, and at the same time so much distended, as to give anasarcaous tumours an unusual firmness. It is in these last circumstances also that an erythematic

thematic inflammation is ready to come upon anasarcaous swellings.

An anasarca may immediately arise from any of the several causes of dropsy which act more generally upon the system: and even when other species of dropsy, from particular circumstances, appear first; yet whenever these proceed from any causes more generally affecting the system, an anasarca sooner or later comes always to be joined with them.

The manner in which this disease commonly first appears, will be readily explained by what I have said in 1650, respecting the effects of the posture of the body. Its gradual progress, and its affecting, after some time, not only the cellular texture under the skin, but probably also much of the same texture in the internal parts, will be understood partly from the communication that is readily made between the several parts of the cellular texture; but especially from the same general causes of the disease producing their effects in every part of the body. It appears to me, that the water of anasarcaous swellings is more readily communicated to the cavity of the thorax, and to the lungs, than to the cavity of the abdomen, or to the viscera contained in it.

7. An anasarca is almost always attended with a scarcity of urine; and the urine voided.

voiled, is, from its scarcity, always of a high colour; and, from the same cause, after cooling, readily lets fall a copious reddish sediment.

The disease is also generally attended with an unusual degree of thirst.

PRACTICAL OBSERVATIONS.

SECT. LXXV.

SCIRRHUS OF THE LIVER.

FROM what has been observed in former parts of this work, when mentioning the use of bile and its application to the purposes of the animal economy, it is obvious, that a considerable diminution of the quantity secreted will be followed by disease. The liver may be rendered incapable of secreting the usual quantity of bile by any defect in its structure; and that this is, frequently, the impeding cause, appears from dissection.

It is an organ very susceptible of chronic inflammation, which, without alarming in the first

* From σκληρον, a hard tumour of an indolent part; indolent, and not readily suppurating.

instance, by painful or active symptoms, gradually induces obstruction; first, with an increase, and frequently afterwards a diminution of ~~its~~ bulk, perhaps ultimately obliterating the capillary system and pori biliarii, the more immediate seat of secretion. In such cases, the patient will be subject,

1. To occasional pain in the right hypochondrium, extending to the scapulæ.
2. A quick pulse.
3. An increase of heat, alternating with chilly sensations.
4. Difficult breathing on quick motion.
5. Some difficulty on lying on the left side.
6. Flatulency.
7. Indigestion.
8. Acidity.
9. Costiveness, together with,
10. A gradual diminution of strength and flesh; and,
11. A pale or fallow complexion.

It is probable, that under these circumstances, the original mischief is in the stomach and duodenum, and that the sympathetic action on the liver is less, on which perhaps healthy secretion may depend; hence dyspeptic complaints generally precede affections of the liver, and arise from intemperance either in eating or drinking, but are more particularly induced by the abuse of spirituous liquors, even though diluted with water.

The

The stomach, by long fasting, has its digestive powers much weakened, by which the secretion of bile is diminished, and a diseased structure of the organ ultimately induced. Grief and anxiety of mind first weaken the powers of the stomach, and ultimately those of the liver, and thereby diminish secretion: a sedentary life will do the same.

We must not, however, confound the two. From repeated observations, says Dr. Saunders, I am induced to believe that the chronic inflammation of the liver is frequently mistaken for a dyspeptic state of the stomach. And I have seen many cases of this kind, which have been supposed to arise from indigestion. The patient generally complains of pain, which he falsely attributes to the stomach; and its continuance is so short, and the degree of it frequently so inconsiderable, that no alarm respecting the future health of the patient is produced. The relief obtained by eructation and discharge of air tends to confirm the opinion that the seat of the disease is in the stomach; but this relief may be explained on the principle of removing the distention of the stomach, and so taking off the pressure of this organ from that which we believe to be the seat of the disease. I believe from experience, that an attention to the following circumstances will enable us with some certainty to distinguish the disease.

In those cases where the liver is affected, considerable pain is felt in the parts near the scrobiculus cordis and epigastric region, upon any degree of pressure; and as the disease advances, an increase of heat, a quickness of pulse, and other symptoms of fever, are observed, especially towards night.

A Scirrhus liver usually ends in incurable jaundice, or ascites*.

SECT. LXXVI.

VITIATED BILE.

THE inhabitants of warm climates are extremely subject to diseases arising from the increased secretion of bile, and the excess of its quantity in the primæ viæ, which, either by regurgitating into the stomach, produces a general languor of the body, together with *nausea*, foul tongue, loss of appetite, and indigestion; or, by being directed to the intestines, excites a painful diarrhœa,

* Vide Dr. Saunders' most excellent treatise on the structure, œconomy, and diseases of the liver. How much would medicine be advanced, if practitioners would take the same pains to investigate the functions and diseases of each separate organ! — In an elementary work, like ours, which gives rather the great outline of a system, we could not indulge in such extensive and useful enquiries, but this idea will not perish with us, when leisure will permit.

ultimately

ultimately tending to weaken their tone, and disturb their regular peristaltic motion. It generally happens that, during the excess and prevalence of bile in the first passages, some absorption of it takes place in the habit, so that the skin becomes yellow, and the urine is sensibly impregnated with it. The pulse is quicker than natural, and there is a considerable degree of thirst, with an increase of heat, the usual symptoms of fever. The body becomes emaciated, and the general aspect of the patient is extremely unhealthy.

The natives of warm climates are less subject to inconveniences arising from the increased secretion of bile than Europeans who inhabit those countries, and whose constitution, by former habits, is ill prepared to admit such increased excitement of the liver, or such additional irritation on the *primæ viæ*, without much derangement of the animal œconomy. The bile in warm climates is, perhaps, more bitter and more saturated with its component parts than in colder countries; it is therefore a more active emetic or purgative; and, although it was not secreted in a large quantity, its effects on the first passages would be more severely felt.

But the disease to which we would particularly call the attention of parents and practitioners is, green bile, or what is better known among mothers,

1. By the appearance of green stools.
2. The bile, instead of being alkaline, is then acid.
3. Instead of being bland, it is acrimonious, and is found even to excoriate the flesh.
4. Hence the pain shewn by the drawing up of the legs of children.
5. Hence their unceasing crying.

But nature kindly rids them of their evil by profuse evacuations, which this excites, and this being now the object of the fond mother's alarm, chalk glysters are thrown up, combined with opiates, or Dalby's Carminative; or some other cordial, mixed with opium, is had recourse to, and the poison is locked up and pent in a body made drunk, dead-drunk, by the inconsiderateness of practitioners, attentive only to one symptom, or the damned wickedness of quack-inventions, which *legally*, and will continue *legally* annually to deprive the community of thousands of innocent beings, until some *patriot* shall arise, bold enough to stem the destructive hydra-monster, which appears daily under new names, and in new shapes, regardless of shame and honour; having one only object in view,—the

SCELERATUS AMOR HABENDI.

The sequel of this pent-up vitiated bile is, convulsions,* enlargement of the mesenteric, tinea capitis, and the various forms of scrophula*.

* Vide the next Section.

PRACTICAL

PRACTICAL OBSERVATIONS.

SECT. LXXVII.

ENLARGEMENT OF THE MESENTERIC GLANDS, &c.

WHEN vitiated bile is pent up in the bowels, some of it gets absorbed, and passing along, is arrested at the mesenteric glands, which swell and obstruct its farther course.

Those glands being the channel by which nutriment is conveyed into the vascular system, it is evident that when they are obstructed,

1. The habit of body must decline.
2. The flesh, that was before firm, will soon become loose and flaccid.
3. The countenance pale.
4. And a general languor and disinclination to exercise of every kind, particularly in the morning, will prevail.
5. The appetite will vary, sometimes it will be pretty good, at other times but indifferent.
6. An

6. An unusual degree of thirst will be experienced.
7. Considerable heat will be excited upon the skin, particularly in the palms of the hands.
8. The breath will be often offensive.
9. The bowels affected with an uneasy sensation,
10. And the size of the belly increased ;
11. The pulse will be quick and small,
12. And the lassitude so much increased, that the little patient will, if permitted, continue in one position for a length of time.
13. Picking or rubbing the nose.

In this stage, the disease is often attributed to teething, if there are yet any teeth expected ; and in other instances to worms, probably from the picking or rubbing of the nose, which has been often considered as characteristic of that complaint. But there seems little propriety in considering this act as characteristic of any particular disease, as it is common to every indisposition accompanied with fever*.

If the children attacked in this manner are of the age of 16, 18, or 20, months, I have almost always been told what fine children they were at

* During fever, most of the natural secretions are diminished, and that of the mucous membrane of the nose among others ; from this diminution the skin becomes dry, the mucus hardens, and there arises a natural propensity to be rubbing or picking it.

ten or twelve months ; that at that period they could walk alone ; but at this time, it was added, they are totally unable, and require more nursing now than ever.

SECOND STAGE.

14. The lymphatic glands, externally, will frequently become enlarged, particularly those of the back part of the head, and under the chin.
15. The lips will be often swelled, and sometimes attended with eruptions round the mouth.
16. The same will appear on the back of the head*, and different parts of the body.
17. The eyelashes will frequently partake of the general indisposition, and become extraordinarily long.
18. At other times, the fingers, toes, back of the hand or arm, have often a morbid appearance ; and, in short,
19. If accurately examined, it will be found that the lymphatic glands, in many different parts of the body, are more or less affected.
20. The alvine discharge is irregular, sometimes the patient shall have a purging for a day or two, but is more frequently to this period costive.
21. The loss of flesh will become daily more

* Often producing the true tinea capitis.

visible, and the bones will appear to grow larger, particularly at the joints.

22. The head also seems preternaturally enlarged*.

23. The ribs become flattened, and often curved almost to a right angle with the

* From the constant constriction of the crura of the diaphragm, the descent of the blood is impeded, more than is thrown to the head. This it enlarges, and great sagacity is often the consequence, which, together with the helpless state of the infant, the more endears it to its mother. The reason why I am inclined to consider rickets and scrophula the same, are,

In the first place, scrophula is acknowledged by most persons, principally to affect the glands and bones; and the same, as far as I can determine, holds good with rickets; for in all the dissections of ricketty patients, that are mentioned by authors, and particularly by Glisson, the various glands of the abdomen, and not only the lymphatic glands of the mesentery, but those about the lungs, &c. have been found much diseased. During life too, the tumid abdomen is scarcely ever absent, which is, *cæteris paribus*, a striking mark of scrophulous affection.

2dly. Debility alone is insufficient for the production of rickets, as many children pass through all the stages and degrees of it, without such effects being ever observed. Some additional disposition of the body seems evidently necessary, and that appears to me to be the scrophulous, or a disposition exactly similar to that which favours scrophula.

3dly. Before the enlargement and incurvations of the bones take place in rickets, there are evident symptoms of a disordered condition of the *primæ viæ*, and of an impeded absorption of the chyle; and these can be explained, I conceive, in no way more satisfactory, than by supposing the previous existence of diseased mesenteric glands.

breast-

breast-bone or the spine, which are occasionally distorted in one or more places; and in proportion to the enlargement previous to the attack of the disease, will this symptom be more or less conspicuous.

It has been before observed, that, in this stage, the complaint has been usually considered as a disease of the bones; but I am inclined to think, that in almost every instance, the bones had been affected with curvature previous to the present indisposition; and that the flatness of the ribs, and prominence of the breast-bone, arose from the pressure in lifting up and down a very heavy child. It is readily admitted, however, that there may be other causes of general debility, and its consequences, some of which have been already suggested. In proportion to the narrowness of the chest, will the contents be pressed down upon the diaphragm, and, thus affecting the belly, become an additional cause of its enlargement, which is now the most distinguishing symptom, accompanied with hardness, frequent pains in the gastric region, and a purging of frothy offensive stools. The pain and enlargement of the belly, instead of being abated, are usually aggravated by this symptom, and the patient is soon carried off, as is supposed, by convulsions of the bowels. In other instances, patients become dropical

cal* in the last stage of this disease, and that is the supposed cause of their death; but there are many examples of children having diseased mesenteric glands, unaccompanied with any of the distinguishing external symptoms here described. These waste away daily, until nothing apparently remains but the bones covered with the skin. In proportion to the progress of the disease in the mesenteric glands, will its consequences be quicker or slower, and the patients will die of a true marasmus or general atrophy.

None of these diseases are hereditary, for you often see among six children one, and one only, cat up with scrophula, whilst the rest are all healthy, and upon enquiry this child has been much troubled with green stools, or what nurses call watery gripes, and has been injudiciously managed.

* In some cases, that I have had the opportunity of examining, which were dropfical, I have found the fluid thick, and apparently mixed with matter, which I have attributed to a suppuration of some mesenteric glands.

PRACTICAL OBSERVATIONS.

SECT. LXXVIII.

HEMORRHOÏS*, OR PILES, AND PROCEDÉNTIA ANI
OR FALLING DOWN OF THE GUT.

A DISCHARGE of blood from small tumours on the verge of the anus, is the symptom which generally constitutes the Hemorrhoids; or, as it is vulgarly called, the hemorrhoidal flux. But a discharge of blood from within the anus, when the blood is of a florid colour, showing it to have come from no great distance, is also considered as the same disease; and physicians have agreed in making two cases or varieties of it, under the names of external and internal hemorrhoids.

In both cases it is supposed that the flow of blood is from tumours previously formed, which are named hemorrhoids, or piles; and it frequently happens, that the tumours exist without any discharge of blood; in which case, however,

* From αιμα, blood, and ρεω, to flow.

they are supposed to be a part of the same disease, and are named *hemorrhoides cæcæ*, or *blind piles*.

These tumours, as they appear without the anus, are sometimes separate, round, and prominent, on the verge of the anus: but frequently the tumour is only one tumid ring, forming, as it were, the anus pushed without the body.

These tumours, and the discharge of blood from them, sometimes come on as an affection purely topical, and without any previous disorder in other parts of the body: but it frequently happens, even before the tumours are formed, and more especially before the blood flows, that various disorders are felt in different parts of the body, as headach, vertigo, stupor, difficulty of breathing, sickness, colic-pains, pain of the back and loins; and often, together with more or fewer of these symptoms, there occurs a considerable degree of pyrexia.

The coming on of the disease with these symptoms, is usually attended with a sense of fullness, heat, itching, and pain in and about the anus.

Sometimes the disease is preceded by a discharge of serous matter from the anus: and sometimes this serous discharge, accompanied with some swelling, seems to be in place of the discharge of blood, and to relieve those disorders of the system which we have mentioned. This serous discharge, therefore, has been named the *hemorrhoids alba*.

In the hemorrhoids, the quantity of blood discharged is different upon different occasions. Sometimes the blood flows only upon the person's going to stool; and commonly, in larger or lesser quantity, following the discharge of the fæces. In other cases, the blood flows without any discharge of fæces; and then, generally, it is after having been preceded by the disorders above-mentioned, when it is also commonly in larger quantity. This discharge of blood is often very considerable; and, by the repetition, it is often so great, as we could hardly suppose the body to bear but with the hazard of life. Indeed, though rarely, it has been so great as to prove suddenly fatal. These considerable discharges occur especially to persons who have been frequently liable to the disease. They often induce great debility; and frequently a leucophlegmatia, or dropsy, which proves fatal.

Sometimes hemorrhoidal tumours are affected with considerable inflammation; which, ending in suppuration, gives occasion to the formation of fistulous ulcers in those parts.

PRACTICAL OBSERVATIONS.

 SECT. LXXIX.

CHORÉA* SANCTI VITI, OR ST. VITUS'S DANCE.

1. THIS disease affects both sexes, and almost only young persons.
2. It generally happens from the age of ten to that of fourteen years.
3. It comes on always before the age of puberty, and rarely continues beyond that period.
4. It is chiefly marked by convulsive motions, somewhat varied in different persons, but nearly of one kind in all; affecting the leg and arm on the same side, and generally on one side only. These convulsive motions commonly first affect the leg and foot.
5. Though the limb be at rest, the foot is often agitated by convulsive motions, turning it alternately outwards and inwards.

* From χορεύειν, dancing.

6. When

6. When walking is attempted, the affected leg is seldom lifted as usual in walking, but is dragged along as if the whole limb were paralytic ; and, when it is attempted to be lifted, this motion is unsteadily performed, the limb becoming agitated by irregular convulsive motions.
7. The arm of the same side is generally affected at the same time ; and, even when no voluntary motion is attempted, the arm is frequently agitated with various convulsive motions.
8. But, especially when voluntary motions are attempted, these are not properly executed, but are variously hurried or interrupted by convulsive motions in a direction contrary to that intended.
9. The most common instance of this is in the person's attempting to carry a cup of liquor to his mouth, when it is only after repeated efforts, interrupted by frequent convulsive retractions and deviations, that the cup can be carried to the mouth.
10. In this disease, the mind is often affected with some degree of fatuity ; and often shews the same varied, desultory, and causeless emotions, which occur in hysteria.

PRACTICAL OBSERVATIONS.

SECT. LXXX.

SEA-SCURVY.

It were needless to delay the attention of the reader long on the ravages of sea-scurvy. It has been said, and I believe with truth, that during the war before last, more British seamen were destroyed by the scurvy alone, than by the wreck of storms, and the united efforts of our combined enemies.

The numbers, who died of fevers and fluxes, were very considerable; particularly in the East and West Indies; but neither of these diseases were so fatal as the scurvy.

During the last war, says a very ingenious and able author, the scurvy prevailed greatly in the fleet under the command of Sir Edward Hughes in the East Indies; and may be accounted one material cause of the want of success in that quarter of the world. I was informed by an officer, who served in that fleet, that the crews

of almost all the ships were so weakened by the scurvy, that, on every occasion when they came to action, they had not men sufficient to man their guns; but particularly that in the last action, not one ship in the British line had men nearly sufficient to manage the guns properly, so many were ill of the scurvy.

The scurvy prevailed likewise considerably in the fleet under the command of Admiral Biron, when it arrived on the coast of America in 1778; owing to their having had a series of wet, stormy weather; and the ships not being supplied with proper preventives.

To shew the effects of this disease on shore, I need only mention the dreadful ravages made by the Scurvy among the Imperial troops in Hungary, as related by Dr. Kramer (1737, *Dissertatio Epistolica de Scorbuto*), the accounts of scurvies which afflicted the Russian armies between the years 1732 and 1744, as given by Dr. Nitzsch; likewise the accounts given by the same author (*Treatise on the Scurvy* by Abraham Nitzsch, 1747) of the distresses occasioned by this disease in Finland, at Wiburg, at the siege of Asoph, &c. &c.—The fatality occasioned by the scurvy among the besieged at Thorn, where “upwards of 6000 of the garrison, besides a greater number of the inhabitants, died of this distemper,” (*Observationes circa Scorbutum Auctore Johanne Fred. Backstrom.*) Those instances are recorded

by Dr. Lind, together with several others, in his Treatise on the Scurvy. And, to come nearer to the present period, the numbers who suffered by the scurvy at Quebec, Mahon, Gibraltar, &c. are instances, (besides many others which might be mentioned) sufficient to prove the mortality among the human species, occasioned by this disease on land.

Sir Richard Hawkins, in speaking of the scurvy, says, that in the course of twenty years, he knew of 10,000 men who had died of the scurvy. —Sir Richard lived in the former part of the last century.

I shall only add, that Lord Anson says, that he lost four-fifths of his people by the sea-scurvy. — And notwithstanding the utmost attention of the commanders, officers, and surgeons, assisted by the advice and abilities of Dr. Blane, physician to the fleet, it appears by the returns made to that gentleman by the surgeons of the different ships; that, of the three diseases, which he very properly calls the Sea Epidemics, viz. fever, flux, and scurvy; the total number of sick; of those sent to the hospital; and of those who died on board of twenty-one ships of the line, and three frigates, in the course of five months; a much greater number were afflicted with the scurvy than with any other disease.

The following extract will shew the proportion of the scorbutics, to those ill of other diseases.

Extract

Extract from Dr. Blane's fourth table, shewing the total number ill of each disease; the number sent to the hospital; and the number of those, who died on board the fleet, in the months of February, March, April, May, and June, 1781.

Fever.			Flux.			Scurvy.		
On board.	Sent to the Hospital.	Dead.	On board.	Sent to the Hospital.	Dead.	On board.	Sent to the Hospital.	Dead.
663	73	62	1028	219	60	1844	1033	89

Hence it appears, that at the above period, the number of scorbutics were more than equal to the number ill of the other diseases united, and that, although a warm climate is by no means favourable to the production of scurvy; and that more died of that disease than either of fever or flux, yet that *even there*, it exerts its baneful influence and deleterious effects.

The characteristics are,

1. The countenance becomes pale, fallow, and bloated.

2. The

2. The patient has a sensation of languor or lassitude, with debility, and aversion to motion.
3. The gums itch, swell, become red and spongy, and frequently bleed on being in the least rubbed.
4. The breath and urine are foetid.
5. The skin is, in general, smooth and shining, but sometimes it is rough, and has the appearance of goose-skin.
6. Livid and black spots of various sizes, vibices, or ecchymoses, are observed on the legs, thighs, and sometimes on other parts.
7. There are pains in different parts, particularly in the legs: in some, the flexor tendons, and other parts about the hams, begin to contract and swell, and the legs and ancles swell considerably, particularly towards night.

In the progress of the scurvy, all the above symptoms increase ;

8. With hæmorrhages from the nose and gums.
9. Sometimes from the lungs and intestines.
10. Considerable discharge of saliva.
11. Increased debility, with a disposition to faint.
12. Putrid, foul ulcers form on different parts, particularly on the legs, which frequently bleed.
13. The legs increase in size, appear œdematous, and become stiff and hard, with a sense of weight in them.

14. Cicatrices of former wounds or fores are dissolved, and ulcers are formed on the parts, which discharge a thin, sanious, foetid matter, or ichor; and within these ulcers there is frequently generated a fungous, fleshy, kind of substance, somewhat resembling coagulated gore; and which has been compared by the sailors to bullock's liver.

In this stage of the disease .

15. The gums are putrid and swollen; so as almost to cover the teeth.
16. The teeth become loose, and sometimes fall out; and the patient is generally incapable of taking any kind of nourishment, but what is very soft or liquid.
17. The contraction about the knees generally increases as the disease advances; and it often happens that those, who are so unfortunate as to have this symptom, have their knees become entirely rigid.
18. Some are afflicted with dysenteries, at which time their stools are extremely offensive, and generally mixed with blood.
19. Many complain of dyspnoea, or difficulty of breathing, attended with a most distressing sensation of tightness across the chest, and troublesome oppression*.

* For further particulars see a very excellent essay on the Sea-Scurvy by Mr. Thompson, surgeon in the royal navy, a work replete with ingenious and useful observations.

Persons deeply affected with the scurvy, whose breasts are much oppressed, and breathing difficult, with stitches in the sides; frequently become consumptive, or dropical, or their legs swell, become œdematous or ulcerated—and during the remainder of their lives, they are subject to violent rheumatic pains, rigidity of the joints, cutaneous eruptions, &c.

Foul ulcers often remain on the legs, and are very difficult to cure; the gums frequently retain the effects of the disease during life, by being either so corroded as to leave the teeth almost bare; or being spongy and swelled so as to cover the teeth too much, and to bleed on the slightest touch.

SECT. LXXXI.

DEFÆDATIONS OF THE SKIN.

1. These are scabby irruptions* over the body.
2. The face is pale.
3. All the vital functions are weak and languid.

* The variety of these have been beautifully illustrated by Dr. Willan, in a work that is a credit both to the author and the nation. Our work is the great outline only, these finish and complete our structure. Vide note, p. 485.

PRACTICAL

PRACTICAL OBSERVATIONS.

SECT. LXXXII.

IN the order proposed, before Anasarca, Scurvy, and St. Vitus's Dance, we should have placed disorders of the womb, but we choose to consider feminine diseases separate from the rest, as being peculiar to one sex only.—We will first, therefore, consider

HYSTÉRIA*, HYSTERICIS.

This disease attacks in

1. Paroxysms or fits.
2. These commonly begin by some pain and fullness felt in the left side of the belly.
3. From this a ball seems to move with a grumbling noise into the other parts of the belly; and, making as it were various convolutions there, seems to move into the stomach; and more distinctly still rises up to the top of the gullet, where it remains for some time, and by its pressure upon the larynx gives a sense of suffocation.

* From *υστέρα*, the womb.

4. By the time that the disease has proceeded thus far, the patient is affected with a stupor and insensibility; while at the same time the body is agitated with various convulsions.
5. The trunk of the body is writhed to and fro, and the limbs are variously agitated; commonly the convulsive motion of one arm and hand is that of beating, with the closed fist, upon the breast very violently and repeatedly.
6. This state continues for some time, and has, during that time, some remissions and renewals of the convulsive motions; but these at length cease, leaving the patient in a stupid and seemingly sleeping state.
7. More or less suddenly, and frequently with repeated sighing and sobbing, together with a murmuring noise in the belly, the patient returns to the exercise of sense and motion, but generally without any recollection of the several circumstances that had taken place during the fit.

This is the form of what is called an hysterical paroxysm, and is the most common form; but its paroxysms are considerably varied in different persons, and even in the same person at different times. It differs, by having more or fewer of the circumstances above-mentioned; by these circumstances

cumstances being more or less violent; and by the different duration of the whole fit.

Before the fit,

8. There is sometimes a sudden and unusually large flow of limpid urine.
9. At the coming on of the fit, the stomach is sometimes affected with vomiting, the lungs with considerable difficulty of breathing, and the heart with palpitations.
10. During the fit, the whole of the belly, and particularly the navel, is drawn strongly inwards; the sphincter ani is sometimes so firmly constricted as not to admit a small glister-pipe, and there is at the same time an entire suppression of urine.
11. Such fits are, from time to time, ready to recur; and during the intervals, the patients are liable to involuntary motions, to fits of laughing and crying, with sudden transition from the one to the other; while sometimes false imaginations, and some degree of delirium, also occur.

This disease occurs especially from the age of puberty to that of thirty-five years; and though it does sometimes, yet very seldom, appears before the former or after the latter of these periods.

At all ages, the time at which it most readily occurs is that of the menstrual period.

In the persons liable to the fits of this disease, it is readily excited by the passions of the mind,
and

and by every considerable emotion, especially those brought on by surprise.

The persons liable to this disease acquire often such a degree of sensibility, as to be strongly affected by every impression that comes upon them by surprise.

Having thus endeavoured to distinguish hysteria from every other disease, I shall now attempt its peculiar pathology. With respect to this, I think it will, in the first place, be obvious, that its paroxysms begin by a convulsive and spasmodic affection of the alimentary canal, which is afterwards communicated to the brain, and to a great part of the nervous system. Although the disease appears to begin in the alimentary canal, yet the connection which the paroxysms so often have with the menstrual flux, and the state of the womb, shows, that the physicians have at all times judged rightly in considering this disease as from an affection of the uterus, and ovaria.

PRACTICAL OBSERVATIONS.

SECT. LXXXIII.

AMENORRHOEA†, OR WANT OF THE COURSES.

THE interruption of the menstrual flux is to be considered as of two different kinds; the one being when the menses do not begin to flow at that period of life at which they usually appear; and the other being that when, after they have repeatedly taken place for some time, they do, from other causes than conception, cease to return at their usual periods: the former of these cases is named the Retention, and the latter the Suppression of the menses.

The retention of the menses, the *emansio mensium* of Latin writers, is not to be considered as a disease merely from the menses not flowing at that period which is usual with most other women. This period is so different in different women, that no time can be precisely assigned as proper to the sex in general. In this climate, the menses usually appear about the age of fourteen: but in

* From α , not, and $\mu\eta\nu\alpha$, the menses.

many they appear more early, and in many not till the sixteenth year: in which last case it is often without any disorder being thereby occasioned. It is not therefore from the age of the person that the retention is to be considered as a disease; and it is only to be considered as such, when, about the time the menses usually appear, some disorders arise in other parts of the body which may be imputed to their retention; being such as, when arising at this period, are known from experience to be removed by the flowing of the menses.

These disorders are,

1. A sluggishness, and frequent sense of lassitude and debility.
2. With various symptoms of dyspepsia; and sometimes with a preternatural appetite*.
3. At the same time the face loses its vivid colour, becomes pale, and sometimes of a yellowish hue.
4. The whole body becomes pale and flaccid.
5. And the feet, and perhaps also a great part of the body, become affected with œdematous swellings.

* This is a very extraordinary symptom. It sometimes accompanies every cessation of the uterine discharge, and frequently appears in the most violent degree, in pregnancy.—In young women, the appetite for chalk, lime, rubbish, charcoal, and various absorbents, is the most prevalent. Stahl, and his followers, made great use of this circumstance in supporting their favourite opinion of the *vis medicatrix naturæ*.

6. The

6. The breathing is hurried by any quick or laborious motion of the body,
7. And the heart is liable to palpitation and syncope. A headach sometimes occurs ;
8. But more certainly pains of the back, loins, and haunches.

These symptoms, when occurring in a high degree, constitute the chlorosis of authors, hardly ever appearing separate from the retention of the menses ; and, attending to these symptoms, the cause of this retention may, I think, be perceived.

These symptoms manifestly show a considerable laxity and flaccidity of the whole system ; and therefore give reason to conclude, that the retention of the menses accompanying them, is owing to a weaker action of the vessels of the uterus ; which therefore do not impel the blood into their extremities with a force sufficient to open these, and pour out the blood by them.

It appears to me, therefore, that the retention of the menses is to be referred to a certain state or affection of the ovaria : but what is precisely the nature of this affection, or what are the causes of it, I will not pretend to explain ; nor can I explain in what manner that primary cause of retention is to be removed. In this, therefore, as in many other cases, where we cannot assign the proximate cause of diseases, our indications of cure must be formed for obviating and removing

ing the morbid effects or symptoms which appear.

I am next to consider Suppression. In entering upon this, I must observe, that every interruption of the flux, after it has once taken place, is not to be considered as a case of suppression. For the flux, upon its first appearance, is not always immediately established in its regular course; and therefore, if an interruption happen soon after the first appearance; or even in the course of the first, or perhaps second year after, it may often be considered as a case of retention, especially when the disease appears with the symptoms peculiar to that state.

Those which may be properly considered as cases of suppression, are such as occur after the flux has been for some time established in its regular course, and in which the interruption cannot be referred to the causes of retention, but must be imputed to some other cause. Accordingly, we often find the suppression induced by cold, fear, and other debilitating causes.

The idiopathic cases of suppression seldom continue long without being attended with various symptoms or disorders in different parts of the body; very commonly arising from the blood which should have passed by the uterus, being determined more copiously into other parts, and very often with such force as to produce hemorrhages in these.

Hence,

Hence,

1. Hemorrhagies from the nose, lungs, stomach, and other parts, have appeared in consequence of suppressed menses.
2. Besides these, there are commonly hysteric and dyspeptic symptoms produced by the same cause.
3. And frequently colic pains, with a bound belly.
4. Often, however, it becomes confirmed chlorosis, whose symptoms have been just now explained.

PRACTICAL OBSERVATIONS.

SECT. LXXXIV.

MENORRHÁGIA*, OR A TOO GREAT MENSTRUAL DISCHARGE.

THE flow of the menses is considered as immoderate, when it recurs more frequently, when it continues longer, or when, during the ordinary continuance, it is more abundant than is usual with the same person at other times.

As the most part of women are liable to some inequality with respect to the period, the duration, and the quantity of their menses; so it is not every inequality in these respects that is to be considered as a disease; but only those deviations, which are excessive in degree, which are permanent, and which induce a manifest state of debility.

The circumstances are those which chiefly constitute the menorrhagia: but it is proper to observe, that although I allow the frequency, dura-

* From *μηνια*, the menses, the monthly period, and *ρηγνυμι*, to burst forth.

tion, and quantity of the menses to be judged of by what is usual with the same individual at other times ; yet there is, in these particulars, so much uniformity observable in the whole of the sex, that in any individual in whom there occurs a considerable deviation from the common measure, such a deviation, if constantly recurring, may be considered as at least approaching to a morbid state, and as requiring most of the precautions which I shall hereafter mention as necessary to be attended to by those who are actually in such a state.

However we may determine with respect to the circumstances above-mentioned, it must still be allowed, that the immoderate flow of the menses is especially to be determined by those symptoms affecting other functions of the body, which accompany and follow the discharge.

When a larger flow than usual of the menses has been preceded by,

1. Headach,
2. Giddiness,
3. Or, dyspnœa, and has been ushered in,
4. By a cold stage,
5. And is attended with much pain of the back and loins,
6. With a frequent pulse, heat and thirst, it may then be considered as preternaturally large.

When, in consequence of the circumstances above noticed, and the repetition of these,

1. The face becomes pale ;
2. The pulse grows weak ;
3. An unusual debility arises during exercise ;
4. The breathing is hurried by moderate exercise ; when, also,
5. The back becomes pained from any continuance in an erect posture ; when,
6. The extremities become frequently cold ; and when in the evening,
7. The feet appear affected with œdematous swelling ;

We may from these symptoms certainly conclude, that the flow of the menses has been immoderate, and has already induced a dangerous state of debility.

The debility, thus induced, does often discover itself also,

8. By affections of the stomach, as anorexia and other symptoms of dyspepsia ;
9. By a palpitation of the heart, and frequent faintings ;
10. By a weakness of mind liable to strong emotions from slight causes, especially when suddenly presented.

PRACTICAL OBSERVATIONS.

SECT. LXXXV.

FLUOR ALBUS, OR THE WHITES.

EVERY ferous or puriform discharge from the vagina may be, and has been, comprehended under one or other of the appellations I have prefixed to this section. Such discharges, however, may be various, and may proceed from various sources, not yet well ascertained: but I confine myself here to treat of that discharge alone which may be presumed to proceed from the same vessels, which, in their natural state, pour out the menses.

I conclude a discharge from the vagina to be of this kind,

1. From its happening to women who are subject to an immoderate flow of the menses, and liable to this from causes weakening the vessels of the uterus.*

2. From

2. From its appearing chiefly, and often only a little before, as well as immediately after, the flow of the menses.
3. From the flow of the menses being diminished, in proportion as the leucorrhœa is increased.
4. From the leucorrhœa continuing after the menses have entirely ceased, and with some appearance of its observing a periodical recurrence.
5. From the leucorrhœa being accompanied with the effects of the menorrhagia.
6. From the discharge having been neither preceded by, nor accompanied with, symptoms of any topical affections of the uterus.
7. From the leucorrhœa not having appeared soon after communication with a person who might be suspected of communicating infection, and from the first appearance of the disease not being accompanied with any inflammatory affection of the pudenda*.

The

* Nothing is more frequent with ignorant practitioners than to mistake a gonorrhœa for a leucorrhœa. Women in general give the name of whites to a gonorrhœa, and therefore the unwary practitioner may the more easily be misled. The distinguishing characteristic of gonorrhœa is, as the author says, an inflammatory affection of the pudenda; but, as few women will suffer an inspection of the parts, we must pay some attention

The appearance of the matter discharged in the leucorrhœa is very various with respect to consistence and colour; but, from these appearances, it is not always possible to determine concerning its nature, or the particular source from whence it proceeds.

The leucorrhœa, of which I am to treat, as ascertained by the several circumstances, seems to proceed from the same causes as that species of menorrhagia which I suppose to arise from the laxity of the extreme vessels of the uterus. It accordingly often follows or accompanies such a menorrhagia.

Some authors have alledged, that a variety of circumstances in other parts of the body may have a share in bringing on and in continuing this affection of the uterus now under consideration: but I cannot discover the reality of those causes; and it seems to me, that this leucorrhœa, excepting in so far as it depends upon a general debility of the system, is always primarily an affection of the uterus; and the affections of other parts of the body which may

tion to the concomitant symptoms. The running in a gonorrhœa is constant, and only in small quantities; in a leucorrhœa the discharge is inconstant, and in large quantities. The other distinguishing marks of a gonorrhœa are, smarting in making water, itching of the pudenda, a swelling of the labia, and frequently of the glands about the loins. Some authors mention the colour of the discharged matter as a distinguishing mark; this, however, is inconstant. Dr. Rotheram.

happen

happen to accompany it, are for the most part to be considered as effects, rather than as causes.

The effects of the leucorrhœa are much the same with those of menorrhagia; inducing a general debility, and, in particular, a debility in the functions of the stomach. If, however, the leucorrhœa be moderate, and be not accompanied with any considerable degree of menorrhagia, it may often continue long without inducing any great degree of debility; and it is only when the discharge has been very copious, as well as constant, that its effects in that way are very remarkable.

The matter discharged in the leucorrhœa is at first generally mild: but, after some continuance of the disease, it sometimes becomes acrid*; and by irritating, or perhaps eroding, the surfaces over which it passes, induces various painful disorders †.

* The young practitioner must not conclude too hastily that an ulcer exists in the uterus when the matter discharged is acrid. Practice has afforded many instances where the matter has excoriated the pudenda, and yet no ulcer existed. A hasty opinion may give a stab to future connubial happiness, and a wound once escaped can never be recalled.

† We are chiefly indebted to the immortal Cullen, for the symptoms characteristic of diseases, and mention this at the conclusion, rather than confuse the reader by continual reference.

THERAPEUTICKS.

SECT. LXXXVI.

INTRODUCTION.

ALTHOUGH the body be made up of separate parts, each performing distinct functions, as the brain, stomach, liver, kidneys, blood-vessels, absorbents, &c. yet are they each to be considered as living bodies, subject each to the same diseased action, which was either too great, or deficient. As in a complete machinery, some parts are weaker than others, and subject to peculiar disease, though referable to the same class. Thus a weakened action of the *brain* produces palsy, mania, and epilepsy; of the *lungs*, pituitous cough or asthma; of the *heart*, palpitation, hypochondriasis, convulsions; of the *diaphragm*, spasmodic asthma; of the *stomach*, dyspepsia, sick-headach, diabetes, and night-mare; of the *bowels*, colic, diarrhœa, spasms, convulsions; of the *kidneys*, a pale flux of urine; of the *absorbents*, the sundry kinds of dropsy; of the *blood-vessels*, hemorrhagies, &c. &c.—Thus the fountain head of all these diseases is *debility*, either general or local, and hence each has been cured by the same remedy, although some remedies experience may have shewn more applicable to one state of disease than the others, as will be shewn in the subsequent sections.

PRACTICAL OBSERVATIONS.

 SECT LXXXVII.

BITTERS.

BITTERNESS is a simple perception that cannot be defined, but must be referred to a matter of experience in which mankind are commonly agreed. What is the nature of the substances possessed of it in a chemical view we cannot determine, or at least we can only in a negative way distinguish it from other matters.

Thus we can say, that bitterness does not depend upon any volatile parts, for the purest and strongest bitters have no smell; and if there are some bitters which give a smell, that again is commonly lost on drying, while the bitter taste and quality remain entire.

In another view, the bitters are without volatile parts, as the purest kinds of them give out in distillation no essential oil; or if some of them do, the oils are without bitterness, and show very
clearly,

clearly, that the bitterness of the entire substance did not depend upon the essential oil in their composition.

We learn also otherwise, that bitterness does not depend upon any such oil in the composition of their substance, as some of the strongest bitters are quite free from any acrid or aromatic quality.

Neither can I find any thing distinctly saline in the composition of bitters. There are hardly any of them which to our taste discover any saline matter except in a few substances, in which some acid happens to be conjoined; but the strongest bitters are absolutely free from any such quality: and so far are acids from entering into the composition of the bitter, that we shall hereafter show the combination of acid to have a tendency to destroy the bitter quality. With respect to any other saline matters to be alledged in the composition of bitters, it is true, that, by particular processes, saline matters can be extracted from bitter substances; but as these saline substances are not extracted, but produced by a destruction of the original mixture, and as nobody has shown that the saline matters are in any certain proportion to the bitterness of the subject, or that they modify it in any certain manner, we cannot make use of any such analysis in explaining the natural composition of bitters.

Upon the whole, I must alledge, that in a chemical view, we cannot explain the nature of bit-

ters. It is a composition *sui generis*, that we can in many cases distinguish from all others; and if in any case we have learned to change its condition, it is from particular experience, and not from any knowledge of its constituent parts.

Before we enter upon what experience has taught in this respect, it will be proper to consider the various purposes in medicine to which bitters may be applied. And as in this view the bitters in their operation on the human body have many of them the same qualities and virtues in common, we think it may be useful to consider, in the first place, what these common qualities are.

First, then, the most obvious operation of bitters is, that being taken into the stomach, they increase the appetite for food, and promote the digestion of it. But we take it for granted, that these functions depend upon the tone of the muscular fibres of the stomach; and therefore may suppose, that the improvement of these functions depends upon an increase of tone in those fibres. And farther, as loss of appetite and indigestion can often be distinctly perceived to occur from a loss of tone in the stomach; so bitters, as they are often effectual in curing these disorders, may be presumed to do it by restoring the tone of this organ.

The correcting the acidity and flatulence of the stomach, may be ascribed to the power of bitters
in

in checking acedcent fermentation, which they do out of the body; and the relieving the stomach from abundant mucus or phlegm, as it is called, may be ascribed to the power of bitters in dissolving viscid animal fluids. As it is, however, probable that both the prevalence of an acedcent fermentation in the stomach, and a superabundance of mucus in it, are commonly owing to a loss of tone; so the correction of those disorders may be ascribed more properly to the tonic power of bitters with respect to the human body than to their chemical qualities.

There is, then, hardly any doubt, that bitters are powerful tonics with respect to the stomach; and there being as little doubt, that the state of the stomach is commonly communicated to the other parts of the system: so it is sufficiently probable, that by an improvement of digestion, the vigour of the system may be in general improved; and that also the tone, and consequently the activity of the whole of the moving fibres, may be increased.

Bitters, however, do not act as stimulants, for they do not increase the frequency of the pulse, nor the force of the circulation; nor do they act as astringents, because they do not always possess any such quality; and therefore they must in such cases act purely as tonics.

There remains only one operation of bitters internally employed; and that is their proving anthelmintic.

thelminthic, and a poison for worms. There is one instance reported of their even mitigating the pains arising from a tænia ; but we do not find any account of their ever expelling that kind of worm. It is said to be the lumbrici teretes to which they are especially adapted ; but from Redis's experiments it appears, that bitters are not an immediate poison to those animals*.

Having

* After having thus considered the general virtues of bitters, I am to offer some general remarks with respect to their administration and pharmaceutic treatment.

The medicinal part of bitters of every kind may be extracted by either watery or spirituous menstruums, and such extractions may have the virtues of the substance from which they have been taken : but I maintain, that hardly in any case they ever have in the same degree, and that, wherever it can be admitted, the bitter in substance is the most effectual, and in some cases the only effectual, mode of exhibiting it. This every body knows to be the case with the Peruvian bark ; and I have found the same to be the case in all my attempts to substitute other bitters in place of that bark.

There are cases, indeed, in which the stomach will not bear either the bark or bitters in substance, and therefore it becomes often necessary to obtain their virtues in a liquid form ; in the management of which, however, several particulars demand attention.

By infusion in water, and even in cold water, bitters give out their virtues ; but to cold water they never give a strong impregnation, though it be generally the most agreeable to the palate and stomach. Warm water, though under the boiling heat, extracts more powerfully than cold, and the more as its temperature is warmer. With respect to every temperature, this is especially to be attended to, that by infusion bitters suffer a gradual decomposition, and consequently the matter extracted is different according to the length of time that the menstruum has been applied ; so that the temperature being given, what

Having now said what relates to bitters in general,

what is extracted in the first hours is a lighter and more agreeable matter than what is extracted after many hours' infusion.

This we have tried with several bitters, infusing the same quantities of the bitter in the same quantity of water, and setting all of them in the same degree of heat, for six, for twelve, for twenty-four, and for forty-eight, hours. In every experiment, it appeared that the impregnation was stronger according to the length of time employed in infusion, and at the same time that the harshness of the taste was sensibly increased. This, however, was remarked, that the difference of the impregnation was not so remarkable in the longer infusions as in the shorter; and therefore the impregnation did not appear in the forty-eight hours so much in proportion stronger than that of twenty-four hours, or so great as that of twenty-four compared with that of six. On the other hand, it appeared that the harshness of taste increased according as the infusion was longer; and therefore the harshness of taste was not so much increased from the twenty-four hours' infusion as that of six, as it was in the forty-eight hours' infusion above that of twenty-four. From all this we conclude, that an infusion of twenty-four hours is sufficient for impregnation, and that little harshness will be produced by infusions of a shorter time; and therefore a sufficiently useful, and the most agreeable, infusion of bitters in cold water, or even of warm water under the boiling heat, will be that of twenty-four hours, or perhaps less. The London college, in limiting their infusions even of boiling water to a single hour, seem to be more nice than is necessary.

The treatment of bitters by cold infusion in wine, is, with respect to extraction, much on the same footing with the treatment by water. It does not appear that wine extracts the medicinal qualities more powerfully than water, or in any instance gives a more efficacious medicine, excepting where the wine concurs in the intention of it as a medicine. It is, therefore, almost only for the purpose of a more agreeable medicine that bitters are infused in wine.

A still more powerful extraction is made of bitters by a boiling heat; and here also the same difference arises from the length of time employed in decoction. With respect to bitters, it is certain that decoction extracts more powerfully than infusion.

neral, we proceed to examine how far the general virtues prevail in the particulars of our list, or under

fig: but by dissipating any aromatic parts that were joined with the bitter, and by extracting more of the earthly part, and what may be called a coarser bitter, decoctions are always more disagreeable than infusions; and therefore what we call extracts, which are always prepared by decoction, are always less agreeable to the stomach than the bitter in substance. It appears to me that decoction decomposes the substance of what is extracted; for it is seldom that decoctions do not upon cooling deposit a part of what they had suspended before, and that also a matter different from the entire substance. What is exactly the nature of the matter impregnating the decoction, has not been duly examined; but we say no more of that here, as it is pretty certain that bitters are never treated by decoction, so as to be either agreeable or very useful medicines.

Besides the ordinary treatment by infusion or decoction, bitters may be treated by the application of water in two other ways. One is, by what I call a Trituration, in the manner of the Comte de la Garaye. In this practice, the substance is broken down into very minute parts; but so far as I can perceive, without any decomposition or division of its constituent parts.

The only separation which seems to be made is that of the more soluble from those of a firmer texture; and so far as these more soluble parts possess the medicinal qualities of the subject, they are obtained very entirely, and that in a state more than any other agreeable to the human stomach. They seem to be much in the same state as they are obtained by an infusion in cold water; which by a proper evaporation affords the same sort of matter that is obtained by the Comte de la Garaye's apparatus. In either way, we may obtain an efficacious and an agreeable medicine; but it is to be doubted if the expence incurred in the preparation will ever allow it to come into much use. •

The other management of the application of water different from the common, is that by the use of a digester. Decoctions are commonly made in open vessels, or in vessels not so accurately closed as to prevent the dissipation of volatile parts; but
this

under what peculiar modifications they are to be found.

this can be obviated by the use of a digester; and though in the glass digester we employ, the heat applied can be conveniently no more than that of the boiling water, yet we find that medicinal substances can be extracted by this apparatus as powerfully as by decoction, and with this advantage, that the volatile parts which either were a part of the substance that is to be extracted, or were added to it for the purpose of rendering it a more agreeable or a more effectual medicine.

Bitters are universally extracted by spirit of wine, and even by a proof-spirit, not so largely indeed for the most part as by water, but in most instances their medicinal parts are extracted more purely; and the tinctures, when they can be employed in tolerable quantity, seem to be more efficacious medicines than any infusions or decoctions in water.

With respect to the tinctures made with a proof-spirit, the same things are to be observed as of those made with water, that there is a gradual decomposition of the substance, and therefore that the tinctures made by a short infusion are more agreeable than those that have stood longer. It should have been observed before, that a spirituous menstruum extracts those bitters that have any aromatic joined with them, more entirely and effectually than is done by water; but in obtaining the spirituous extract, if this be done by drawing off the spirit by distillation, this advantage is commonly entirely lost.

With respect to both the extractions by water and by spirit, this is to be remarked, that the most agreeable bitter is to be obtained by a short infusion; and a stronger impregnation of the same agreeable bitter is only to be got by a repeated cohabitation of the same menstruum upon fresh parcels of the same material.

This further is to be remarked, that watery infusions, if made tolerably strong, prove very disagreeable; and the employment of the tinctures with rectified spirit will always be limited by the menstruum; and therefore the tinctures made with proof-spirit will always give the most convenient extraction: and I have found that the employing a digester for brandy tinctures makes a more powerful extraction than can be got by long infusion, and that with very little trouble.

PARTICULAR BITTERS.

GENTIAN.

I begin with this root because I find it to be a most simple and pure bitter, more perfectly free from any of that aromatic or astringent quality which is so frequently conjoined with others: at the same time it is a pretty strong bitter, and has every virtue that has been ascribed to bitters in general, which we have detailed above.

There has been some question about the species of gentian most fit to be employed. The *gentiana lutea* is chosen by the British dispensatory; but if in Germany they employ the *gentiana rubra*, it will make very little difference. In Norway they employ the *gentiana purpurea*, and perhaps with advantage. For some time past we have had the root of this species imported into this country under the title of *Cuscuta*, so named from the Norwegian name of it *Skarsote*. Some persons have thought it a stronger bitter than the common gentian, or root of the *gentiana lutea*: but I know of no experiments made for proving this; and it appears to me in its sensible qualities to be very much the same with the common gentian.

The root of gentian is of a light brown colour without, and a yellow or gold colour within. It abounds with a resin and gum intimately mixed, and has a strong bitter taste, which is rendered much more grateful, when covered with the aromatic bitter of the orange peel.

The extract of gentian is a useful stomach bitter, and is generally exhibited with an aromatic, or some additional power, in the form of pills. The dose from 10 to 30 gr.

The compound infusion of gentian is a light pleasant bitter, it strengthens the stomach and restores the appetite, but when flatulency prevails, should be joined with about an eighth part of the Tinct. Cardamom. or some other carminative. The dose of this infusion is a common wine glass full twice a day.

The

The following are excellent formulæ:

R. Infus. gentian. comp. dr. 10.—Kali ppti. gr. 2.—Spir. Piment. M. Ft. haust. vacuo stomacho, primo mane, iterumque horâ ante prandium sumend.

That is, take of the compound infusion of gentian, ten drachms.—Prepared kali, two grains.—Spirit of pimento, two drachms.—Make into a draught to be taken on an empty stomach, early in the morning, and again an hour before dinner.

R. Infus. gentian. comp. unc. 3.—Aq. menth. pip. unc. 2.—Syr. zingib. unc. 1.—Spir. ammon. comp. dr. 1.—Ft. mist. capt. coch. larg. 2. in cyath. aq. font. bis vel ter in die.

That is, take of compound infusion of gentian, three ounces.—Peppermint water, two ounces.—Syrup of ginger, one ounce.—Compound spirit of ammonia, one drachm.—To form a mixture of which, two large spoonfuls are to be taken twice or thrice a day, in a glass of cold water.

R. Gentian. dr. 2.—Rhei incis. dr. 1½.—Lign. quassie, dr. ½.—Coriand. contus. dr. 2.—Aq. fervent. lb. 1.—Macer. per hor. 24, cola, capt. coch. larg. 2, primo mane, horâ 11 matutin. et horâ somni sing. diebus.

That is, take of gentian root, two drachms.—Sliced rhubarb, a drachm and a half.—Quassia wood rasped, half a drachm.—Bruised coriander seeds, two drachms.—Boiling water, a pint.—Infuse for 24 hours, strain off, and let the sick person take two large table spoonful early in the morning, at eleven in the forenoon, and again at bed-time, every day.

R. Extract. gentian.—Myrrh.—Kali ppti. aa, dr. ½.—Spir. vin. q. s.—F. pil. 16 quar. capt. 4, bis die, superbibend. cyath. aq. pur. cum gutt. 40, mist. sequent.

Tinct. aromatic, Ph. Ed. dr. 4.—Tinct. aloës comp. dr. 1.—F. Mist.

That is, take of extract of gentian.—Myrrh.—Prepared kali, of each, half a drachm.—Make sixteen pills, of which take four pills twice a day, drinking after them a cup of pure water, adding to it 40 drops of the following mixture:

Aromatic tincture, four drachms.—Compound tincture of aloes, one drachm.—For a mixture.

QUASSIA.

QUASSIA.

Quassia, parts used, the wood, root, and bark.—It is the production of a tree growing in Surinam. The wood transversely cut, is radiated, white, solid, and tough; the thicker pieces preferred, the root deeper colour. Dose. Substance in pills 10 to 20 gr, every four or six hours, or 1 to 2 oz. of the infusion, made with 2 drs in a pint of boiling water. The infusion in boiling water to stand an hour, in cold water 24 hours. We can find nothing in this wood but a pure and simple bitter. In several specimens I have found the bitterness to be pretty strong; but for the most part it is, to my taste, not more bitter than the colombo, nor even than good gentian. We are obliged to Professor Murray for his compilation on the subject of quassia; but after all that has been said by him and Mr. Ebeling, we find hardly any virtues ascribed to quassia which have not been to other bitters. Upon the whole, I believe quassia to be an excellent bitter, and that it will do all that any pure and simple bitter can do: but our experience of it in this country does not lead us to think it will do more; and the extraordinary commendations given of it are to be ascribed to the partiality so often shown to new medicines, and especially by those who first introduce them, and by those who have a connection with the country from whence they are brought.

The following are excellent formulæ:

R. Quass. ras. dr. $1\frac{1}{2}$.—Aur. Hispal. Cort. dr. 1.—Aq. fervent. lb. 1.—Stent in vase aperto, per horæ spatium, et cola. Infusi colati sumantur coch. tria vel quatuor bis quotidie.

That is, take of the raspings of quassia, a drachm and a half.—Orange peel, one drachm.—Boiling water, a pint.—Let them stand in a covered vessel for the space of an hour, and then strain off, of this three or four table spoonfuls are to be taken twice a day.

R. Infus. quass. dr. 4.—Natr. ppti, gr. 8.—Tinct. cinnam. comp. dr. 1.—Aq. menth. pip. dr. 5.—Ft. Haustus ter in die sumend.

That

That is, take of infusion of quassia, two drachms.—Prepared natron, eight grains.—Compound tincture of cinnamon, one drachm.—Peppermint water, five drachms.—For a draught to be taken three times a day.

Infus. quass. unc. 2.—Test. ostreor. præp. gr. 15.—Spir. ammon. comp. gtt. 20.—Rhei pulv. gr. 2.—Ft. Haust. horâ 11 matutin. vel bis quotidie sumend.

That is, take of infusion of quassia, two ounces.—Prepared oyster shells, fifteen grains.—Compound spirit of ammonia, twenty drops.—Powder of rhubarb, two grains.—For a draught, to be taken at eleven, or twice a day.

R. Quass. incis. dr. 2.—Aq. fervent. lb. 1.—Macerate, et frigesfactum cola,—liquor. colat. Adde tinct. cardam. unc. 2.—Spir. lavend. comp. unc. $\frac{1}{2}$.—Rhei pulv. dr. $\frac{1}{2}$.—Ft. Mist. capt. coch. larg. 4, primo mane, meridiæ, et horâ decubitûs.

That is, take of quassia cut in slices, two drachms.—Boiling water, a pint.—Macerate, and strain off when cold.—To this add tincture of cardamom, two ounces.—Compound spirit of lavender, half an ounce.—Powder of rhubarb, half a drachm.—Make a mixture, and take of it four large table spoonfuls early in the morning, at twelve at noon, and at bed-time.

SIMAROUBA.

Simarouba.—The light, tough, stringy, yellowish bark of a tree growing in Guiana, and brought in long pieces. Qual. No smell; but a lasting bitter, and sub-astringent taste. Use. Chiefly in chronic diarrhœas, and dysenteries. Dose. In a decoction of 2 dr. in 2 pints of water to 20 oz. three spoonfuls every four hours; or from 10—20 gr. of the powder.

The following are excellent formulæ:

R. Simaroub. contus. dr. 2.—Aq. puræ, lb. 2.

Decoque ad dimidium et cola; dein adde tinct. cinnam. unc. 1.—Ut ft. mist. astringens. Capt. coch. larg. 4, ter die.

That is, take of pounded simarouba, two drachms.—Pure water, a quart.—Boil to half that quantity, and strain off, then

then add tincture of cinnamon, one ounce. For an astringent mixture. Four table spoonfuls are to be taken three times a day.

R. Cort. Simaroub. dr. 1. $\frac{1}{2}$.—Cort. cinnamon. dr. 2.—Catechu, dr. 2.—Aq. fervent. lb. 1.—Macerate per horas 4, vase clauso, dein cola.—Liquor. colat. unc. 7.—Tinc. cardam. comp. unc. 1.—Confect. opiat. dr. 1.—Ft. Mist. astringens. Sumt. coch. larg. 4, sextâ quâquâ horâ.

That is, take of simarouba bark, a drachm and a half.—Cinnamon, two drachms.—Catechu, two drachms.—Boiling water, one pint.—Macerate for four hours, in a covered vessel, then strain off to seven ounces of the strained liquor.—Compound tincture of cardamom, one ounce.—Confection of opium, one drachm.—For an astringent mixture, of which four large table spoonfuls are to be taken every six hours.

COLOMBO.

This root is brought to us from the East Indies, and is the part in use. It comes in roundish pieces, which are covered with a rough brown bark, and, when cut transversely, exhibit a large central disk, with brown streaks, and yellow points. It is a good stomachic bitter, and has a strong antiseptic quality; softens on chewing, and tinges the saliva with a slight yellow hue. This root is considered in the Eastern parts as an excellent remedy in bilious complaints, particularly in the cholera morbus, having first cleansed the stomach and bowels with thin small liquids; and, as it does not belong to the class of heating bitters, it may be used in hectic cases: it is also particularly serviceable in sinkings at the pit of the stomach, and habitual vomitings. We have become acquainted with this root only within these forty years. It was first brought into Holland, where it was introduced as a remedy in dysentery; and both in Holland and in Germany it was employed in that disease with much commendation.

I find this root to be a strong and agreeable bitter, have employed it in many instances of dyspepsia with great advantage. In stopping vomiting it has frequently answered.

The

The following are the best formulæ :

R. Colomb. pulv. gr. 10.—Pulv. aromatic, gr. 5.—Ft. pulv. bis die sumend.

That is, take of colombo powder, ten grains.—Aromatic powder, five grains.—To form a powder, to be taken twice a day.

Colomb.—Rhei pulv. aa, dr. 1.—Aq. fervent. lb. 1. —Ft. Infus. per hor. 24, colā, liquor. colat. cap. coch. larg. 4, primo mané.

That is, take of colombo sliced, powder of rhubarb, equal parts, one drachm, boiling water, a pint.—Make an infusion for 24 hours, strain off, take of the strained liquor four large table spoonfuls the first thing in the morning.

R. Colomb.—Rhei pulv. aa, dr. 1.—Cons. aur. Hisp. q. s. —Ft. pil. 30—quarum Capt. pil. 3, ter in die.

That is, take of colomb, rhubarb, in powder, of each, one drachm, conserve of orange peel, as much as is sufficient.—Make into 30 pills, of which 3 are to be taken three times a day.

CHAMOEMELUM.

Camomile.—Under this title we have two plants whose flowers are employed, as marked in our list; and there is some question which ought to be preferred. The virtues are precisely of the same kind; but I have always judged the Roman or double-flowering camomile to be the strongest; and if any regard is to be had to the essential oil, this certainly affords the greatest quantity; and I am informed, that in warmer climates, where it is a native, the qualities of it are much stronger than with us.

These flowers have been long celebrated as stomachics; and I have found them answer both in powder and in infusion the purposes of any other bitters. Before the introduction of the Peruvian bark, they were much employed in the cure of intermittent fevers; and our celebrated countryman, Dr. Pitcairn,

Pitcairn, was of opinion, that their powers, in this respect, were equal to those of the Peruvian bark.

Hoffman seems to have thought them a very effectual, and at the same time a safer remedy. I have accordingly employed them; and agreeable to the method of Hoffman, by giving, several times during the intermission, from half a drachm to a drachm of the flowers in powder, have cured intermittent fevers, more especially when joined with myrrh. I have found, however, that these flowers were attended with this inconvenience, that, given in a large quantity, they readily ran off by stool, defeating thereby the purpose of preventing the return of paroxysms; and I have found, indeed, that without joining with them an opiate, I could not commonly employ them.

The following are the best formulæ:

R. Chamæmel. pulv. scr. 1.—Syr. cort. aur. q. s.—Ft. Bolus bis die sumend.

That is, take powder of camomile, one scruple.—Syrup of orange-peel, as much as is sufficient.—Make into a bolus, to be taken twice a day.

R. Chamæmel. flor. dr. 2.—Rhei incis. dr. ½.—Coriand. contus. aa, dr. ½.—Aq. fervent. lb. 1.—Ft. Thea capt. ante prandium cyath. plen. sing. diebus.

That is, take of camomile flowers, two drachms, Rhubarb sliced, and coriander seeds bruised, of each half a drachm.—Make into a tea, of which a cupful is to be taken every day before dinner.

R. Chamæmel. flor. in pulv. trit. scr. 1.—Myrrh. pulv. gr. 5.—Rhei pulv. gr. 3.—Ft. pulv. (vel syrupo simplici, bolus,) bis in die sumend.

That is, take of camomile flowers, in powder, one scruple.—Myrrh in powder, five grains.—Rhubarb in powder, three grains.—Make into a powder, or into a bolus, by means of simple syrup, to be taken twice a day.

SALIX.

Willow.—The bark of the *salix alba*, pentandria, vitellina, has been proposed as a substitute for the Peruvian bark. The testi-
nies

monies of Stone, Clossius, and Gunzius, are very strongly in their favour: and although we have not had many opportunities of employing them in intermittent fevers, the few that have been made show that they may be in some cases an effectual remedy.

Their sensible qualities seem to me to be that of a pretty strong, but sufficiently agreeable, bitter, with somewhat of stypticity. These qualities persuade me that they are very valuable medicines, and promise to be a substitute for the bark as much as any other substance I have known to be offered.

The following is an excellent formula:

R. Salicis vitellinæ alb. vel pentand. pulv. dr. 3.—Quassia. —Myrrhæ pulv. aa, dr. 1.—Aquæ fontanæ, lb. 1.—M. f. m. cujus cap. cochl. 2 vel. 3, ter quaterve sing diebus.

That is, take of willow bark, finely powdered, three drachms, quassia, powdered, myrrh in powder, each one drachm; pure water, a pint.—Mix them together, and let the patients take two or three table spoonfuls three or four times a day.

GENERAL OBSERVATIONS.—I must beg leave to observe, that the strength, as well as the dose of these bitters, must be adapted to the constitution and circumstances of the patient. If they heat too much, they must be weakened, or taken along with some drops of the elixir of vitriol*. When bitters lie heavy on the stomach, and lessen, instead of mending, the appetite, they ought to be omitted, and the cure must be attempted by other remedies.

These remedies are usually applied for disorders, peculiarly of the stomach, which they brace, and they are usefully combined with other kinds of medicines, which are presently to be-treated of.

* Mead monita medica, p. 109.

PRACTICAL OBSERVATIONS.

SECT. LXXXVIII.

ASTRINGENTS.

ASTRINGENTS are such substances, as applied to the human body, produce a contraction and condensation in the soft solids, and thereby increase their density and force of cohesion. If they are applied to longitudinal fibres, the contraction is made in the length of these ; but if applied to circular fibres, they diminish the diameters of the vessels or cavities which the fibres surround.

The operation of astringents in general, in condensing the solid, appears from their use in the tanning or making of leather, in which they are so frequently employed.

The same operation also appears from their antiseptic power, which seems to depend upon their preserving the firmness and cohesion of the animal substances to which they are applied, for a much longer time than the firmness would have continued in these substances without such application.

*

By

By what means astringents produce the contraction of the solid parts of animal bodies, is not very evident. It does not seem to be by introducing a matter into their substance; and in some cases it seems to be rather by absorbing and abstracting their fluid parts. In some cases, where the substances applied are such as coagulate the fluids of the human body, as acids and alcohol, we can readily understand how the same should condense and contract the solids formed of the same fluids which those matters coagulate. It does not, however, appear, that other astringents, void of acidity, act in the same manner; and their operation must be referred to an attraction taking place between these astringents and the particles of the animal solid.

In forming a table of medicines according to their several operations on the human body, it seemed proper to distinguish them as they operate upon the simple solid, which is much of the same nature in the dead as in the living body; or as they operate upon the sensible and moving solids, which have their qualities and powers only as they exist in a living body. This distinction, on many occasions, will be necessary and useful, but we cannot follow it throughout; and on these occasions, where the medicines at the same time operate upon both the simple and living solid, the consideration of their operation cannot be taken separately.

This

This is the case with respect to our present subject, as astringents often operate upon the solids of both kinds. This, indeed, has not been always observed; and it has been commonly supposed, that astringents act more upon the simple than upon the living solid: and therefore, that they act almost only on the parts to which they are immediately applied. A very learned physician in writing on hemorrhagy, has this expression: "I do not lay any great stress upon the use of internal astringent remedies, because it does not appear likely from reasoning that they should do any service; and I am far from being convinced by experience that they ever do, except perhaps in hemorrhagies of the primæ viæ." HEBERDEN, in Med. Transf. Vol. II. 432. This, however, I cannot hold to be just; and by the corrugation and constriction of the whole mouth and fauces, which happens from a small portion of astringents being applied to a small part of the tongue, I hold it to be demonstrated that astringents act upon the sentient nerves; and therefore that the astringent effects may be communicated from one part to very distant parts of the body. The same conclusion appears clearly to be formed from this, that astringents taken into the stomach show their effects in other parts of the body so quickly, that they can hardly be supposed to have passed further than the stomach itself; and therefore

fore their sudden effects in distant parts must be ascribed to an astringent power communicated from the stomach to those other parts.

It may, indeed, be alledged, that the astringent matter is in some cases carried further than the stomach, and into the course of the circulation: but it must still be observed, that in many of those cases the quantity of matter introduced is so small, that when again diffused in the mass of blood, and equally distributed to the different parts of the body, it is obvious, that the portion of it applied to a particular part cannot be sufficient to produce any effect upon it; and therefore the effects which appear must be ascribed to the general operation on the stomach. Of all this doctrine, and particularly of the propagation of astringent power from the stomach to other parts, we have a strong proof in this, that some of the most simple astringents taken into the stomach very soon after prevent the recurrence of a paroxysm of an intermittent fever, which implies a very general operation on distant parts.

As it is, therefore, established, that astringents act upon the moving fibres, as well as upon the simple solid, it will be readily conceived, that to their operation on the former their most considerable effects on the living body are to be ascribed. As they contract the moving fibres, and increase their force of cohesion, they must increase their

contractility, or what I call their tone; and they are, therefore, often properly named Tonics; and upon the same ground are fitly enough named Strengtheners or Corroborants.

In the first place, by their effects on the human body, or by the taste they give in the mouth; creating a sense of constriction not only in the parts with which they come immediately in contact, but also in the whole of the internal surface of the mouth and fauces. This sense of constriction is different in different substances, and I believe its degree may be taken as a mark of the power which such substances may exert as astringents in the stomach, or other parts of the body.

In the second place, we discover an astringent quality in bodies by their being applied to a solution of green vitriol, in which they produce a black colour. This we suppose to be owing to the astringents abstracting the acid of the vitriol from the iron it was before joined with; and that therefore the iron falls down in the form of a black powder. I shall not insist further on the theory of this operation, but shall endeavour to apply it to our purpose.

As experiments show that astringent substances applied to the solution of vitriol produce more suddenly a black colour, and that of a greater degree of blackness, in proportion to the other marks they give of their astringency, so we may
employ

employ this experiment to determine the power of astringency in different substances. For this purpose, the learned BERGIUS, in his late Treatise on the Materia Medica, has given us his experiments of the application of almost every vegetable substance to the solution of green vitriol; and I have much reason to believe, that his experiments have been accurately made and faithfully reported. From them, I think we learn what I have just now alleged, that the astringent power is in proportion to the suddenness with which they strike a black colour, and to the degree in which they produce it. By this the learned author points out what substances are the most powerful astringents; and in like manner, what are the weaker kinds of the many which formerly entered promiscuously into our lists of astringents: and I shall hereafter make use of his experiments in determining the astringent power of particular substances.

The general effects of astringents on the human body are expressed above in the definition; but in what different states of the body, that is, in what diseases they are to be employed, is yet to be said.

In all cases of general debility, they may be supposed to be useful; and in that state which has been called a Cachexy, and which often

forms the beginning of dropsy, the preparations of bark, more especially when joined with steel, have been employed with much benefit: but I do not know of any other simple astringent, that in the same case has been employed with advantage. In one case, their power in taking off the atony of the system is very remarkable, and that is in the case of intermittent fevers. It is true, that, even for this purpose, their tonic powers are much increased by their being combined with bitters and stimulants, as we shall explain in another place; but in the mean time, as the most simple astringents frequently answer the purpose, it does not prevent our perceiving that astringents by themselves are capable of increasing the tone of the moving fibres over the whole body.

Astringents are considered as especially useful in restraining excessive evacuations; and in the first place, hemorrhagics, or the evacuations of red blood; and I have no doubt of their being fitted for this purpose, or of their truly answering it: but I must own, that there is no practice in which I have been more frequently disappointed than in the employment of astringents in the case of hemorrhagy. I ascribe my failure to this, that though astringents taken into the stomach give some increase of tone over the whole system;

tem ; yet they are not powerful enough for producing such contraction in distant parts, as may be sufficient for overcoming the impetus of the blood in the vessels.

Astringents are also employed in restraining the excess of ferous evacuations ; and are therefore employed in the case of diarrhœa. Here their efficacy is evident ; and will be readily accounted for by their being immediately applied to the parts affected. But it is extremely necessary here to take notice of an error very generally prevailing in writers on the *materia medica*, in their relating the virtues and powers of astringents. They very generally mention the virtues of astringents as equally adapted to diarrhœa and to dysentery ; but I maintain that these two diseases are very different from one another : so that while diarrhœa consists in an increased evacuation from the exhalants and excretories on the internal surface of the intestines, which may be restrained by astringents applied, the dysentery consists or depends upon an increased constriction in a considerable portion of the intestinal canal, which must be increased by the application of such astringents. This is now well understood ; and practitioners very universally observe, that astringents are not only ineffectual, but very hurtful in dysentery ; and therefore we assert, that the marking of astring-

gents as equally adapted to both diseases is a pernicious error*.

Beside diarrhœa, astringents are said to be suited to the restraining of other ferous evacuations; but I must say, that in practice I have been as much disappointed in these cases as in the case of hemorrhagy: and upon the same ground, that the effects of astringents taken into the stomach are not propagated so powerfully to distant parts as to produce the constrictions required in them. This I have had occasion to observe with regard to the Leucorrhœa, or Fluor Albus. For the cure of this disease, I find forty remedies recommended by writers on the materia medica; but I have met with forty cases of it, in which not one of those remedies were of any service.

It may be supposed by some, that there is an analogy between those cases of increased ferous evacuations, and the excessive discharge of a ferous fluid from ulcers; and, therefore, that to remedy this, internal astringents may be employed. I believe the propriety of this measure may be well founded; but at the same time it does not appear that the good effects in these cases depends upon a constriction produced on the extremities of the vessels pouring out the fluids, so much as
upon

* Of this we have spoken more at large, when treating on putrid fever and dysentery, in Vol. IV. and V.

upon restoring the tone, perhaps the inflammatory state, of the vessels that is necessary to the production of laudable pus*.

But previous to our entering particularly upon this subject, it may be necessary to consider

* With respect to the pharmaceutical treatment of astringents, we in the first place observe, that they are most useful when they are taken in their entire state, and when given, as the common language is, in substance; and we are persuaded that the gastric liquor extracts them more powerfully than any other menstruum we could apply. It is, however, on many occasions, proper to employ them in a liquid form; and for that purpose they have been treated by distillation, infusion, and decoction.

Astringents very rarely consist of odorous or volatile parts. They are very universally of a fixed nature, and nothing rises from them in distillation with water; and even in those cases where their odorous and volatile parts arise, it is found that no part of the astringent quality is at the same time communicated to the distilled water; and therefore the distilled waters drawn from astringents formerly kept in the shops, were on that account absolutely inert.

Astringents are properly enough treated by infusion, and readily yield their qualities either to an aqueous or spirituous menstruum. The extract obtained by water is in larger proportion than that obtained by spirit: but that the astringency is greater in the one than in the other is not certainly determined; and the choice of the infusions is made rather according as the menstruum is more or less adapted to the purpose of the medicine, than by any consideration of the astringent power extracted by it.

Astringents are also treated by decoction in water; and in this way a stronger impregnation can be obtained than by infusion: but it appears to me that the astringent matter is extracted in a more entire state by infusion, and that in decoction there is always some decomposition takes place; with what effect, however, on the substance as a medicine, we cannot determine.

*PARTICULAR ASTRINGENTS.***CINCHONA.**

Bark seems to be a substance in which the qualities of bitter and astringent are conjoined. These are sufficiently obvious, and seem to be universally allowed. It may also have somewhat of an aromatic quality; but this certainly is not considerable, and I shall not take any further notice of it.

As a bitter and astringent conjoined, I consider the bark as a powerful tonic. As we have before shown that these qualities in their separate state give tonic medicines, so it will be readily allowed, that, conjoined together, they may give one still more powerful; and as such we are now to consider the bark in its effects and virtues, according as these appear in the various cases of disease.

The first to be taken notice of is, its operation on the stomach. In many cases dyspeptic symptoms manifestly arise from a loss of tone in the muscular fibres of the stomach; and in such cases as other bitters are, so the bark is a remedy, and one of the most powerful. Nobody doubts of its being a tonic with regard to the stomach; and it is equally well known that the state of the stomach is readily communicated to the rest of the system.

The bark is more strengthening and less heating than any of the bitters. It may be given either in substance or decoction, or infused in cold or in boiling water, in lime-water, wine, brandy, or rum.

The bark in substance, frequently disagrees with delicate stomachs, and occasions sickness, gripes, and sometimes a looseness. An infusion or decoction of it in water, especially, if some grateful aromatic, such as cinnamon or nutmeg, be added, is less apt to produce these effects; but when infused in brandy, with some bitters or aromatics, it will agree well with most people. The bark in substance often sits lighter on the stomach, if a glass of red port be taken after every dose of it; and the gripes and purging, which it occasions in some, may be certainly prevented by adding, for a few days, a few drops of laudanum to it; for after the stomach and bowels have

have been accustomed to the use of the bark, it generally occasions either much less disturbance, or none at all.

For several years past, I have frequently joined the bark and bitters in the following form :

R. Cort. Peruvian. Pulv. unc. iv.—Rad. Gentian.—Cort. Aurant. aa unc. i. $\frac{1}{2}$ Misce.—Infunde in spir. vin. Gall. lib. iv. in balneo arenæ per dies vi. et cola.

That is, take of cinchona four ounces, gentian and orange peel of each an ounce and an half.—Mix and infuse in four pints of brandy in a sand bath for six days, and strain off.

Of this tincture, says Dr. Whytt, I generally give one table spoonful, with four or five spoonfuls of water, every morning, an hour and a half before breakfast, and between seven and eight in the evening. I sometimes add to each pound of this tincture, an ounce or more of the sp. lavend. comp. which improves its taste, and makes it sit better on some stomachs.

I have, myself, taken the above tincture in the morning, for eight months together, and with remarkable advantage. For three or four years before, I had been much troubled with wind in my stomach, a giddiness and sometimes a faintness. I observed in the morning, soon after taking this medicine, a grateful sensation in my stomach, accompanied with better spirits than I had at any time through the day, or than I ever found from drinking wine, even when I used it freely. I have ordered this tincture to many patients, who have taken it for two or three months successively, and, after intermitting it for some time, have begun again. Most of them have found benefit, and those most who used it longest. The cases were chiefly weak and windy stomachs, with a general delicacy or debility of the nervous system.

Although the bark is preferable, as a strengthener, to any of the bitters, yet it does not wholly supersede their use. The bark alone will not sit so well on many stomachs, as when it is joined with an agreeable bitter; and I think I have found more benefit, myself, from the above tincture, than from the bark alone either in substance or decoction. With regard to the safety of taking, for a long time, the bark, against which
many

many have had great prejudices; I cannot say that I do recollect its proving hurtful in any case in which I have ordered it, unless where it happened to disagree with the patient's stomach. About fourteen years since, I swallowed, in sixteen days, near four ounces of it in substance, when I laboured under a catarrhus cough, without feeling any bad effects from its astringent quality. In a tertian intermittens, attended with a cough and spitting, after the use of vomits and some pectorals, I have prescribed the bark in the usual quantity, without the breast being any ways hurt by it. I have had repeated experience of its virtues in curing a hoarseness after the measles, unattended with a fever or difficult breathing. Lastly, the success of the bark in resolving inolent glandular swellings*, may shew that it is not possessed of any considerable obstructing quality.

We proceed therefore upon the supposition that the bark possesses a tonic power, and that the action of this power in the stomach will sufficiently explain its operation in preventing the recurrence of the paroxysms of intermittent fevers: for I see no foundation for referring it to any mysterious and unexplained specific power, which, however, some writers seem still disposed to maintain. I hold it to be established as a fact, that both astringents and bitters, in their simple and separate state, have proved often sufficient to prevent the recurrence of the paroxysms of intermittent fevers: and that they more certainly do it when combined together. Both these facts I have not only from the testimony of the most creditable authors, but from particular experiments made by myself for the purpose of ascertaining them.

Among other diseases complicated with fever, the dysentery is to be taken notice of as a disease in which the propriety of using the bark does not seem to be very clearly ascertained. When this disease is of its proper nature; that is, depending chiefly upon a constriction of the colon, and frequently in its beginning attended with some phlogistic diathesis, the use of the bark appears to me to be absolutely pernicious. I have indeed said above, that even in this state, bitters, by their laxative quality, may frequently be useful: but such a quality in

* See Medical Inquiries and Observations, Vol. I.

the bark is very uncertain; and therefore the analogy with bitters will hardly imply the use of a bitter that may be in this way of uncertain effect, and may be in danger, by its tonic and inflammatory powers, of proving hurtful. In the beginning of dysentery, we judge the bark to be improper; but in the advanced state, when some symptoms of putrescency appear, or when the disease has changed in some measure into the state of diarrhœa, the bark may possibly be employed with advantage *.

In another case of dysentery, which sometimes happens; that is, when it puts on a tertian type, and may be considered as a part of the tertian fever, at the same time epidemically prevailing, the bark may become an absolutely necessary remedy.

There is a disease complicated with fever, in which I find the use of the bark to be somewhat nice and difficult; and that is in catarrhal affections. In these, arising, as they commonly do, from cold, an inflammatory diathesis is, I believe, constantly present; and this seems to forbid the use of the bark altogether. But there are two cases in which it may be admitted; the one is, when the catarrhal affection is combined with an intermittent fever, as mentioned before; and I have often observed the most frequent and violent fits of coughing to be joined with the paroxysms, and particularly with the cold stage of such paroxysms. In such cases I not only do not avoid the bark, but fly to it with the more haste.

There is also another case of catarrhal affection in which the bark is of great service. This is in those habitual and frequently returning catarrhs, which depend upon a weak and imperfect perspiration by the skin, and this again upon a weaker force in the action of the heart and arteries. In these cases I suppose there is a greater determination to, and a greater than usual accumulation of, fluids in the lungs; and that these circumstances and their effects are only to be obviated by invigorating the system of the aorta, for which I hold the bark to be the most effectual mean.

Another case of delicacy, on which I would here remark, is that of hæmorrhagy; in which the use of the bark is, in my opinion, very inaccurately ascertained, but may, I think, be

* Vide Vol. IV. and V.

determined in this manner. When the hæmorrhagy is of the active kind, that is, accompanied with a phlogistic diathesis, which however is seldom the case, the bark is a pernicious medicine, and I have always found it to be so. There are, however, very many cases of passive hæmorrhagy, a frequent instance of which occurs in the hæmorrhagia, where the disease depends upon a laxity of the extremities of the uterine vessels, which are therefore readily opened by every irritation applied to the system, or to the diseased part. In such cases the bark is the most proper, and, when the remote and exciting causes can be avoided, an effectual remedy. Upon this subject two remarks may be made: one is, that though an hæmorrhagy may seem to be excited by irritation, it is not therefore to be immediately concluded to be of the active kind, and therefore forbidding the use of the bark. The other remark is, that the bark, in passive hæmorrhagy, does not act as an astringent, in which way its powers are very inconsiderable, but as a tonic, which might be hurtful in any hæmorrhagy of the active kind.

After mentioning catarrh and hæmoptysis, I am, in some measure, necessarily led to say something with respect to the use of the bark in the Phthisis Pulmonalis.

It is generally allowed, that phthisis depends for the most part on a scrophulous constitution; and no person, I presume, will deny, that the tubercles, ulceration, and even inflammation of the Lungs, are often connected likewise with a state of debility of the system at large; especially when the complaint has made any degree of progress. Practitioners are now so sensible of this truth, that the antiphlogistic plan of treatment is seldom carried to that length which was formerly the practice. The insufficiency of it in the advanced periods of the disease, became every day more apparent; so that physicians have been obliged to acknowledge, that the intention of taking away a small quantity of blood occasionally, is rather to procure a temporary relief, than with the expectation of effecting a cure. Many have even admitted, that it is rational, in the mean time, to support the vigour of the body by means of tonics and a more generous diet; hence the use of myrrh and chalybeates, which have been highly recommended by Dr. Gmüths and Dr. Saunders.

But

But at the same time that the debility attendant on phthisis pulmonalis has not intirely escaped the attention of medical men, they have contended, that the inflammation and ulceration being peculiarly situated, from the great quantity of blood which circulates through the lungs, any increased impetus of circulation, produced by stimulants, must be severely felt, and a train of unfavourable symptoms immediately excited. Some have affirmed, that the exhibition of Peruvian bark has been known to occasion the greatest difficulty in respiration under such circumstances, and that it is therefore to be considered in the light of an uncertain or hazardous remedy. Authorities, however, are not wanting in favour of the bark, when prudently administered. Besides Morton, who extols it highly, we have the testimony of Sir John Pringle in its favour. He observes, that he had frequently given three or four spoonfuls of a decoction of bark twice a day, without observing that it heated, or obstructed the breathing; but, on the contrary, that it had the best effect*.

If the quantity of the remedy employed by this author be thought too inconsiderable to afford any conclusion in its favour, it may be proper to refer to an account of several very alarming cases of pulmonary affections successfully treated by a more liberal exhibition of bark, lately published in the Medical Communications †.

The authorities also formerly mentioned, under the head of catarrh, a disease much connected with consumption, may be adduced in further support of the utility of bark in this disorder; and it may contribute to the same purpose, to insert in this place, from an author of reputation, who has lately written on the *Materia Medica*, the following passage: "*Binos ipse ab empyemate Chinchina (i. e. Cort Peruv.) curavi. Quot magis sputa fœtent, eo certior cura. In phthisi pulmonali sæpè quidem præclara præstat, sæpè autem nihil efficit. Quandò apthæ accesserunt, symptomaticæ in hoc morbo, non evidenter nocuit, nisi sputa suppressisse diceres. Certè, ubi sputa in phthisi nimis abundant, Cortex*

* Dr. Thornton's *new* practice is to give tonic medicines, which is employed in all other ulcers, and at the same time to diminish local inflammation by the inhalation of a reduced atmosphere. Vide Dr. Beddoes's *Considerations*.

† See Medical Communications, Vol. I. p. 260, &c.

"indicatur;

“ indicatur; si verò, cum oppressione pectoris, subito diminuantur, Cortici non inhærendum.—Nullam vidi noxam ex moderata dosi Chinchina quotidie sumpta in phthysi, etiamsi sanguis, per venam sectam emissus, crusta inflammatoria obductus subinde fuit *.”

I am well aware that there are certain cases to which the bark is by no means adapted; but the same objection may be made to any plan of treatment—All that is necessary then to be done, is to make a cautious trial of such tonic remedies; as for instance, of an infusion or decoction of bark in the first place; and if no inconvenience arises to the patient, good encouragement is afforded for the exhibition of the powder, with or without the tincture of roses. I have seen it employed more than once, in this mode of combination, with advantage, and should on that account, in most cases, give it the preference.

We are certainly called upon, by the miserable sufferers who are afflicted with consumption, to give them this or some other similar chance of a recovery. If the ulceration, or what may be sometimes as bad, or worse, a considerable state of induration, or numerous tubercles without any supuration, be found beyond the reach of medicine, the satisfaction of protracting the life of the patient a few months, by strengthening the body, may still perhaps remain. And I must confess, that on the whole, I should be disposed to form greater expectations from bark, in preventing this formidable disease, in scrophulous and delicate habits disposed to it, than in wholly subduing it after it has once established itself; though even here it deserves a full trial.

I have met, adds Dr. Cullen, with cases in which, with all the symptoms of phthisis, the exacerbations of the hectic were marked with more or less of a cold stage, and regularly, at stated periods, commonly quotidian, but sometimes tertian. In such cases, I have given the bark with the effect of preventing the return of such paroxysms for some time, and at the same time with the relief of almost all the other symptoms of the disease. I never, however, in such cases, made a complete cure; for, in spite of large exhibitions of the bark, the paroxysms, in less than a fortnight or three weeks after they

† Vide Bergius Materia Medica, Tom. I. p. 109.

had been stopped, always returned: and though they were again and again, by the same means stopped, they returned with greater violence, and proved fatal, with all the ordinary symptoms of phthisis.

As the Phthisis Pulmonalis depends so often upon tubercles of a peculiar nature, which with no probability can be resolved by the bark; so this is another reason for my avoiding the use of it in this disease. But whether, Dr. Cullen adds, there be cases resembling very exactly the phthisis from tubercles, in which however there are none present, and therefore a more curable disease, and perhaps admitting the use of the bark, I cannot positively determine, but am disposed to believe, that there are cases, with all the symptoms of phthisis pulmonalis, without tubercles*; in which case the bark may possibly be useful. In all the cases of convalescence which happen to a purulent expectoration, I judge the disease to have been of this kind.

I shall next take notice of its use in some other diseases; but after what I have said above of tonics in general, and of bitters more particularly, it only remains to say here, that in the cases to which bitters are adapted, the bark, as being more powerful, must be especially proper.

There are two diseases, seemingly depending on the laxity of the system; and therefore it has been supposed that the bark might be, and it is alleged that it has been, actually useful in the cure of them. These are the diseases of scrophula and rickets. I have no doubt that in both a considerable degree of laxity and flaccidity takes place in the system; but I am very far from thinking that either of the diseases consist alone, or even chiefly, in this circumstance; and I have before adduced reason to render it probable that these diseases depend upon certain peculiar conditions of the system, which do not arise from, but indeed rather induce a general laxity of, the frame.

Spasmodic diseases, depending upon a weakness of tone in the system, are very often cured by the use of the bark. Accordingly, it has been much employed in many of these, and particularly in cases of epilepsy; but in this I have been often disappointed. When epilepsy depends upon organic affections of the brain, I believe no remedy is to be found for it:

* Diffusion has certainly proved this supposition.

or when this disease is connected with a plethoric state, and is excited, as it frequently is, by an occasional accumulation of the blood in the vessels of the brain, I think neither the bark nor any other tonic can be properly or safely employed. It is only when epilepsy depends upon a mobility of the system that we can expect the bark to prove a remedy; and in such cases it may possibly have often proved useful: but I have hardly found it to be so, and am of opinion, that the fossil tonics, as chalybeates, cuprum ammoniacum, flowers of zinc, or white vitriol, are always found more effectual.

There is indeed one convulsive disorder in which I have found the bark remarkably useful; and that is the chorea sancti viti, which I believe to depend upon a state of mobility at a certain period of life. In this disease, I think the preparation of copper and zinc cannot be employed with safety so often, or rather so long, as might be necessary; and therefore, that chalybeates and bark are the safer remedies: and we are of opinion that the latter is more safe than the former.

With respect to asthma, my doctrine must be the same as with respect to humid catarrh. And when the asthma depends upon the mobility of the system, as in the hysteric or convulsive asthma of Sir John Floyer, the bark is an useful remedy; and in some instances I have found it to be so.

There remain to be mentioned some spasmodic affections, in which the bark has been much celebrated. These are commonly named Hysteric, and are of very various forms. In these cases in which such paroxysms as I have before described, under the title Hysteria, appear, I take this to be the genuine form that may be strictly so named; and to be a disease of one determined kind, and occurring perhaps only, at least especially, in females of an irritable temperament.

There are a great number of ailments which are frequently named hysteric, or more commonly nervous diseases, that are of very great diversity; and by their symptoms, not to be brought under any general character. If therefore we are to attempt any thing with regard to their general nature, it must be by presuming to establish a general cause. This I allow to be an uncertain plan; but I do not know at present how to do better.

In attempting this, I would refer the nervous diseases to one or rather two general causes: the one is a weakness of tone, and thence a mobility of system, in sanguine temperaments, or in such as are not manifestly melancholic; and the other is, in melancholic temperaments, a more or less torpid state of the nervous power prevailing; in consequence of which various irregularities in the functions of the nervous system arise.

All this would need much explanation, but I cannot attempt that here; and I do not think myself sufficiently prepared to enter upon it fully. The only use I shall make of it at present is to say, that wherever morbid affections of the chronic kind can be perceived to depend upon a weakness of tone and mobility of the system, chiefly appearing in symptoms of dyspepsia, the bark is likely to prove an useful remedy; but that in the cases of torpor, with firmness of tone, it is likely to be not only an useless, but even a hurtful remedy. The latter I take to be the case, in what I would strictly name hypochondriasis. Of this, indeed, medical people have various notions, but seldom clear or well digested: and if some have asserted that they have found the bark useful in cases of hypochondriasis, I suspect they have not properly distinguished between hypochondriasis and dyspepsia. The latter may be frequently attended with timidity, doubt, and despondency; but it may still be a very different disease from the proper hypochondriasis.

I have thus endeavoured to consider the use of the bark in all the variety of disease in which it may be applied, or in which it has been commonly employed; and upon the subject it remains only to say, in what manner it may most properly be exhibited.

The following are very excellent formulæ:

R. Decoct. cinchon, unc. 7.—Tinct. cinchon comp. unc. 1.
—Myrrh. pulv.—Colomb. pulv. aa. dr. 1.—Kali ppti, scr. 1.
—F. Mist. capt. coch. larg. 2, primo mane, horâ 11, matutin,
horâ 6 vespere, et horâ somni.

That is, take decoction of bark, six ounces.—Compound tincture of bark, one ounce.—Myrrh, columbo, of each equal parts, one drachm.—Prepared kali, one scruple.—For a mixture.

ture.—Two table spoonfuls are to be taken early in the morning, again at eleven, at seven, and at bed-time.

OBSERVATIONS.—This is a *most excellent formula* to invigorate the system. In some cases, a table spoonful of it, night and morning, may be given, and twice that quantity at the other periods. If there be any affection of the chest, the colunbo may be left out, and the quantity of myrrh doubled. Where the kidneys are affected, the quantity of kali must be two drachms, the myrrh left out, and only one table spoonful be taken four times a day. Where the patient is much troubled with wind, a drachm and an half of æther may be added, and if the bowels are constrained, they should be kept open; where piles have happened with the electuary of sena and sulphur, equal parts, a tea spoonful or more night and morning. But when that is not the case, the following pills are excellent.

R. Pil. ex aloë e myrrh, gr. 12.—Calomel, gr. 1.—Extr. gentian. scr. 1.—Ferr. vitriolat. gr. 10.—Syr. simp. q. s.—Ft. Pil. 8. capt. pil. 1, horâ somni et primo mane.

That is, take of pill of aloes, with myrrh, twelve grains.—Calomel, one grain.—Extract of gentian, one scruple.—Vitriolated iron, ten grains.—Simple syrup, as much as is sufficient.—Make into 8 pills. One is to be taken at bed-time, and another in the morning.

The following is one of Dr. Hugh Smith's famous formula, who so successfully adopted the tonic and stimulant practice in asthenia.

R. Decoct. cinchon, unc. 6.—Tinct. cinchon comp. unc. 1½.—Tinct. gentian. comp. unc. ½.—Æther vitriol, dr. 2.—Ft. Mist. capt. coch. larg. 3, horâ 11 matutin et 6 tâ vespere.

That is, take of decoction of bark, six ounces.—Compound tincture of bark, an ounce and a half.—Compound tincture of gentian, half an ounce.—Vitriolic Æther, two drachms.—For a mixture.—Take 3 large table spoonfuls at eleven, and at six in the evening.

R. Decoct cinchon, unc. 6.—Tinct cinchon comp. unc. 1.—Acid vitriol. dil. dr. 1.—Syr. cort. aur. unc. ½.—Ft. Mist. cujus coch. larg. 2, ter quaterve indies adhibeantur.

That

That is, take of decoct. of bark, six ounces.—Compound tincture of bark, one ounce.—Diluted vitriolic acid, one drachm.—For a mixture, of which two table spoonfuls three or four times a day are to be administered.

R. Cinchon. flav. in pulv. crass. contus. unc. $\frac{1}{2}$.—Ros. rubr. exsicc. dr. 2.—Aq. fervent. unc. 12.—Macerate in vase idoneo, et liquorem frige factum cola.—Infus. colent. unc. 7.—Adde acid. vitriol. dil. dr. 1.—Syr. simp. unc. $\frac{1}{2}$.—Ut Ft. Mist. cujus cap. coch. larg. 3, vel 4, bis vel ter in die.

That is, take of yellow bark, in rough powder, half an ounce.—Red roses, dried, two drachms.—Boiling water, twelve ounces.—Let them remain together in a proper vessel, and when cold strain off 7 ounces of this liquor, add 1 drachm of diluted vitriolic acid, simple syrup, half an ounce.—To form a mixture of which 3 or 4 table spoonfuls are to be taken twice or thrice a day.

CORTEX QUERCUS.

Oak-Bark.—This is considered as the most powerful of the vegetable astringents; and its universal use and preference in the tanning of leather renders the opinion very probable. Accordingly it has been much employed as an astringent medicine, and commended for every virtue that has been ascribed to astringents either internally or externally employed; but except its degree of power, it has no peculiar qualities to distinguish it from other astringents. I have frequently employed the decoction with advantage in slight tumefactions of the mucous membrane of the fauces; and in several persons liable, upon a slight application of cold, to a prolapsus uvulae, or falling down of the uvula. In many cases this decoction, early applied, has appeared useful in preventing those disorders which otherwise were wont to arise to a considerable degree. I have, indeed, almost constantly joined a portion of alum to these decoctions; but I have frequently found that a solution of alum alone, of the strength it could be conveniently employed in, did not prove so effectual.

I have employed the oak-bark in powder, giving it to the quantity of half a drachm every two or three hours during the intermissions of an ague ; and, both by itself and joined with camomile flowers, have prevented the return of the paroxysms.

All these virtues, in a considerable degree, are found to belong to the cupulæ or scaly cup which embraces the bottom of the acorns.

GALLÆ.

Galls.—Although these substances are the work of animals, we consider them as entirely of a vegetable nature, and put them here immediately after the oak-bark, as they are an excrescence from the same tree, and a substance of the same qualities with the bark we have been just now treating of. It is supposed to be the most powerful of vegetable astringents ; and I am ready to believe it to be so, though it has not been employed so often, or in such a variety of cases, as many others have been. About the beginning of this century, in some parts of France, the Gallæ had got a reputation for the cure of intermittent fevers ; and it was pointed out as a proper object of attention to the Academy of Sciences ; who accordingly appointed Mr. Poupert to inquire into the matter. His report may be seen in the Memoirs for the year 1702. It amounts to this, that in many cases the galls cured the intermittents ; but that it failed also in many cases in which the Peruvian bark proved effectual.

In this country, of late, a particular use of galls has prevailed. Finely powdered, and mixed with eight times their quantity of hog's lard, they are made into an ointment ; which, applied to the anus, night and morning, has been found to relieve hemorrhoidal affections ; and we have known some instances of its being useful.

The direction is,

R. Gall. in pulv. trit. dr. 1.—Adipis suill. præp. unc. 1.
—Tere simul ut fiat unguentum. quo partes affectæ nocte maneatque illinantur.

CORTEX GRANATORUM.

The rind of the fruit of pomegranate.—The strong styptic taste of this part, and the black colour it strikes with green vitriol, shew sufficiently its astringent power; and it is commonly supposed to be among the strongest of this kind. As at the same time it gives out such a large portion of its substance to water in infusion or decoction, it seems to be particularly fit for affording a liquid astringent; and I have frequently found it particularly useful in gargles, in diarrhœa, and in external applications.

A formula against diarrhœa is:

R. Cort. granat.—Flor. balaust.—Cinnam.—Rad. tormentil. Flor. ros. rubr. $\overline{\text{aa}}$ dr. 1.—Coque in aq. puræ et lactis vascin.—sing. libra ad consumpt. dimidii; coletur et partitis decibus quotidie sumatur.

That is, take of rind of pomegranate.—Flowers of pomegranate.—Cinnamon.—Tormentil root.—Flowers of red roses, of each, one drachm.—Boil them in a pint of milk and the same quantity of water, until they are reduced to a half; strain off, and at intervals this is to be taken during the day.

LIGNUM CAMPECHENSE.

Logwood.—This wood is of a considerably astringent quality, and its use in dying is a sufficient proof of it. It has not, however, been employed except in the case of fluxes, and it is alleged to have been very useful in dysenteries: but we judge this to have been at the end of these only, when the disease was in the state of diarrhœa; for it was from the employment of this very medicine in the beginning of dysenteries, that I learned, says Dr. Cullen, what mischief arose from the use of astringents in the beginning of that disease.

The following are the most common formulæ:

R. Lign. campechen. ras. unc. 1.—Aq. distil. lb. $\frac{1}{2}$.—De-coque ad libram unam, et cola.—Liquor. colat. unc. 7, ad-

detur tinct. cinnamon. unc. 1.—Ft. mist. astringens; ejus cap. coch. larg. tria post singulas sedes liquidas.

That is, take of raspings of logwood, one ounce, distilled water, a pint and a half, boil to a pint, and strain off; to 7 ounces of this liquor, add 1 ounce of tincture of cinnamon.—To make an astringent mixture, of which take 3 large table spoonfuls after each liquid motion.

R. Extr. lign. campech. scr. 1.—Aq. cinnam.—Aq. menth. pip. aa. dr. 6.—Ft. haustus, 6tâ. quaquâ horâ sumend.

That is, take of extract of logwood, one scruple.—Cinnamon.—Peppermint water, equal parts, six drachms; for a draught to be taken every six hours.

KINO.

Kino, the gum-resin.—We are informed by Dr. Fothergill, that it is a gum which exsudes from incisions made in the trunks of a certain tree called Pau de Sangué, growing in the inland parts of Africa; but the botanical account of this tree we have not yet met with.

Both by its sensible qualities, and by its striking black with a solution of green vitriol, we have grounds for supposing it a powerful astringent: and we have found it prove to be such in several instances of diarrhœa. I am informed also by a good practitioner, of its having been useful in some uterine hemorrhagies, particularly those after child-bearing. In some cases of fluor albus I have been disappointed of its effects when employed by itself; but the Edinburgh college have properly joined it with alum in the pulvis stypticus: and this composition proves one of the most powerful astringents I have ever employed.

The best formulæ are,

R. Kino pulv. dr. 1.—Alum. pulv. dr. 3.—Ft. pulv. styptic. (Ph. Edin.) cap. gr. 5 ad 15, quartâ quâquâ horâ.

That is, take of gum kino, in powder, one drachm.—Alum in powder, three drachms.—Sign it the styptic powder of the Edinburgh Pharmacopœia, from five to fifteen grains, are to be taken every four hours.

R Kino

R. Kino pulv. gr. 5.—Pulv. cret. comp. cum opio gr. 10.—Ft. pulv. vel syrupum zing. addendo, bolus, ad alvum constringendum mane sumend.

That is, take of kino in powder, five grains.—Compound powder of chalk, with opium, ten grains.—For a powder, or by adding syrup of ginger, a bolus, to be taken in the morning to constringe the bowels.

R. Kino pulv. gr. 10.—Confect. opiat. scr. 1.—Ft. bolus horâ somni sumend.

That is, take of kino in powder, ten grains.—Opiate confection, one scruple.—Make into a bolus to be taken at bedtime.

R. Rhei pulv. gr. 6.—Kino pulv. gr. 10.—Pulv. cret. comp. cum opio gr. 12.—Ft. pulv. ex cyath. vin. rubr. lusitan. bis die sumend.

That is, take of rhubarb in powder, six grains.—Kino in powder, ten grains.—Compound powder of chalk, with opium, twelve grains.—Make into a powder, to be taken in a glass of red wine, twice a day.

R. Kino dr. 1.—Gum. arab. scr. 2.—Syr. pap. alb. q. s.—Ft. linctus, cujus cochl. minimum sæpius in die delingatur.

That is, take of kino, a drachm, gum arabic two scruples, syrup of white poppies, as much as is sufficient, for a linctus, of which a small tea spoonful is to be dissolved in the mouth often in the day.

BISTORTA.

Bistort, both by its sensible qualities and by the colour it gives with green vitriol, and by the extracts it affords, seems to be one of the strongest of our vegetable astringents, and is justly commended for every virtue that has been ascribed to any other. As such we have frequently employed it, and particularly in intermittent fevers, and in larger doses than those commonly mentioned in materia medica writers. Both by itself and along with gentian, we have given it to the quantity of three drachms in one day.

TORMENTILLA.

TORMENTILLA.

This root, by its sensible qualities, and by its striking black with green vitriol, appears to be one of the strongest astringents of this country; and therefore it has been justly commended for every virtue that is competent to astringents. I have had several instances of its virtues in this respect; and particularly I have found it, both by itself and as joined with gentian, cure intermittent fevers; but it must be given in substance and in large quantities. Two parts of tormentil root to one of camomile flowers in powder, both cheap plants, the products of our own country, form in conjunction an excellent substitute for the Peruvian bark.

ALUMEN.

Alum.—I do not think it my business here to give any account of the practices by which this substance is produced from several fossil matters, as this has been done already by several writers extremely well, especially by Fourcroy; nor do I think it necessary after Margraaf to give any account of the peculiar part of clay that, with the vitriolic acid, enters into the composition of alum. It is enough for me, that this is a substance very well known; and that in the same state in which it is employed in various arts, and as commonly exhibited in our shops, it is sufficiently pure and fit for the purposes of medicine.

Here we are to consider only its use in medicine, and chiefly as an astringent of the most powerful kind. It is used both internally and externally. With respect to its internal use, I am surprised to find that it seems not to have been employed with other astringents in diarrhœa. Some materia medica writers indeed mention its being suited to cure this disease; but I have not met with any practical writer who prescribes it in such cases. Governed like other practitioners by imitation and habit, I have seldom employed it; but I have employed it sufficiently to make me judge that in diarrhœas it may be used with advantage.

It has been given internally, chiefly in the cases of hemorrhagy from the lungs or from the uterus. It should be given

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at first in small doses, as it is ready to irritate the stomach : and in several instances I have found it rejected by vomiting. In urgent cases, however, the doses must be frequently repeated and increased, for it has been only from large quantities given, that its effects have appeared to be considerable. We begin by giving it in doses of five grains ; but have gone the length of a scruple, and have given such a dose several times in a day.

Since the time that Helvetius wrote *Des Pertes de Sang*, and proposed alum as a specific for the cure of these, it was long common to employ alum in the form proposed by Helvetius, that is, as fused with a certain proportion of *Sanguis draconis*, supposed to be an astringent : but as this is a medicine not soluble in the human fluids, and therefore absolutely inert, it has been justly rejected. If, as Dr. Lewis supposed it to be, more slowly dissolved in the stomach, and therefore introducing the alum more gradually, it might be proper ; but we are persuaded that the *Sanguis draconis* rather prevented the operation of the alum altogether : and if the slow introduction is to be studied, this may be obtained by smaller doses than even those above-mentioned. The Edinburgh college have thought proper to continue the title of *Pulvis Stypticus*, that our practitioners had been long accustomed to ; but they have added a more valuable astringent than the dragon's blood, that is, the gum kino, which does not make in colour or dose a medicine different from the composition formerly kept in the shops.

Alum is more frequently used externally than internally, particularly in gargles, in relaxations of the uvula, and other swellings of the mucous membrane of the fauces, when there is not at the same time any acute inflammation present. In many persons who are liable to be affected with this swelling from slight applications of cold, we have known the disease prevented, or soon removed, by the use of a decoction of oak-bark, to a pound of which half a drachm of alum and two ounces of brandy were added. The same gargle, without the spirits, is useful in the case of spongy swelled gums and loose teeth, from scurvy or other causes.

Alum is also useful in curing the *ophthalmia membranarum*, and seems to me more powerful for this purpose than white vitriol. It is commonly employed in the form of the coagulum

coagulum aluminosum; but I have found the solution in water to be still more effectual, employing from two to five grains of alum to an ounce of water.

The formulæ are,

R. Alumen. in pulv. gr. 10.—Cons. ros. rubr. scr. 1.—Ft. bolus, bis terve indies sumendus.

That is, take of alum in powder, ten grains.—Conserve of red roses, a scruple.—Make into a bolus, to be taken twice or thrice a day.

R. Alumen in pulv. trit. scr. 2.—Infus. ros. unc. 6.—Mel rosar. unc. 1.—Ft. gargarism. sæpius in die utend.

That is, take of alum in powder, two scruples — Infusion of roses, six ounces. —Honey of roses, one ounce.—Make a gargle to be frequently used during the day.

The six last articles are usually employed in diarrhœas, and hæmorrhagies: it is very common to consider also the chalk as an astringent, but it can have its effect only from absorbing acidity prevalent in the primæ viæ, and being combined with opium, which has a known sedative effect rendering the bowels torpid for a time, chalk has certainly obtained a greater reputation than it merits.

The following is the usual formula:

R. Mist. cretac. unc. 1½.—Tinct. cinnam. dr. 2.—Tinct. opii gtt. 15.—Ft. Haustus, 6ta quaquâ horâ sumend.

That is, take of the chalk mixture, an ounce and an half, tincture of cinnamon, two drachms, tincture of opium fifteen drops, for a draught, to be taken every six hours.

Starch is, on account of the mucilage it contains, often used in diarrhœa, in clysters, and otherwise, for which last purpose, an ounce of licorice root sliced, with half an ounce of linseed, infused in a quart of boiling water, is employed with advantage to sheathe and lubricate.—This is also an useful beverage in pleurisies and colds.

SECT. LXXXIX.

PURE STIMULANTS.

THE idea commonly annexed to the term Stimulant, is that of a power suited only to excite the action of moving fibres; but I am here to consider stimulants more generally, as exciting the motion of the living principle, whether producing sensation or as producing the action of moving fibres.

Very generally, indeed, the motions begin in the former: but it is not necessary, as some have supposed, that they should always do so; for there are powers which, directly applied to the moving fibres, excite their action without any previous sensation excited, or without any intervention of the brain; which appears clearly from hence, that the motion of moving fibres can be excited so long as the living or irritable principle subsists in them, though they are entirely separated from the rest of the body, and entirely therefore removed from all sense.

The operation of stimulants, either in an extensive or more limited view, is difficult to be explained; because our knowledge of the living principle or nervous power, and of the various modifications

modifications of the different states of its mobility, is still very imperfect. Some have imagined, that the operation of stimulants might be mechanically explained by the figure of their particles; but while the Corpuscularian philosophy is at present so much deserted, we do not think it necessary to take any pains to discuss the futilities advanced on this subject: and however it may be, it seems enough to observe, that we know in general that the nervous power may be in different states of mobility, and that there are substances which, applied to the nerves, have a power of increasing or diminishing their energy. The former we have named Stimulants, the latter Sedatives.

This then is the general idea of stimulants, that they are powers capable of increasing the mobility, and of exciting the motion of the nervous power. Here, however, it is proper to remark, that by the nervous power being acted upon by stimulants, we strictly mean not only that electric fluid which is readily moveable in the brain and nerves, but also that oxygenous fluid which is under a peculiar modification in the moving fibres, and gives them what we name the inherent power. It is fit also to remark here, that in this manner we must distinguish between stimulant and tonic powers, which both act upon the same power, and have been commonly confounded together. Although they may mutually increase the effects of each other, they are still in
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their nature and operation to be considered as distinct and different.

Having thus given a general idea of the operation of stimulants, I proceed to consider the various modifications of that operation as it is determined either by the circumstances of the parts of the body to which they are immediately applied, or by the various nature of the substances that may be employed to act.

In the first place, we shall consider them as they are applied to organs of peculiar sense, which are excited by the impressions of certain matters only; or as they are applied to parts which have a sensibility in common with the whole of the nervous system, and when their effects are modified by the state of the moving fibres in the parts adjoining.

With respect to the whole of the stimulants applied to the organs of sense, we have to remark, that the exercise of sensation is in general a stimulant power, and is a chief means of supporting the mobility of the living principle in the nervous system; more especially in what concerns the animal functions.

It relates also to all the cases in which sensation is produced, to remark, that the effects of the stimulus seem to be in proportion to the force of the impression producing them. As a certain degree of this is on many occasions necessary to render them pleasant; so in proportion to the pleasure

pleasure arising from them, their stimulus is greater: and farther, as all strong impressions give pain; so in proportion to this also, they are more strongly stimulant.

From certain other circumstances beside that of force, sensations are either agreeable or disagreeable; the former being always stimulant; the latter being, as I judge, always sedative, or perhaps indirectly stimulant, as we have explained before.

Of particular sensations, those of light and noise have their stimulant effects in proportion to their force; or sometimes independent of that, according to certain circumstances rendering them more agreeable.

Odours are very much on the same footing, but have often more immediate and strong effects on the sensorium; and to explain that, it may be observed, that with respect to other parts of the system, the medical virtues of many substances seem to depend upon their odorous parts; which seems to point out their particular activity with respect to the nervous system.

Sapid bodies do not so readily or powerfully affect the sensorium; but the activity of sapid substances applied to other parts, often corresponds with the force of their impressions upon the tongue.

In considering the operation of substances upon the skin, it is not always easy to distinguish the
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effects of impressions applied to what is strictly the organ of sense, from the effects of impressions made upon that sensibility which the skin has in common with all the other parts of the nervous system.

It seems to be an operation on the nervous papillæ of the skin, when a certain gentle undulatory motion applied to the skin produces a sense of tickling, which often proves stimulant. It is also chiefly an operation not only upon the same organ, but partly also upon that of the common sensibility; when certain substances applied to the skin produce a sense of itching, which is always stimulant, and often continues till it produces redness and other circumstances of inflammation.

These are the observations which I can make on the action of stimulants applied to organs of sense: and this in general is to be remarked, that though we should expect that impressions upon these organs should be especially and only communicated to the brain, and although, which is truly the case with all moderate impressions, exciting peculiar sensations, which for the most part act only upon the brain, and little or none at all either upon the organ itself, or upon the parts immediately adjoining to it; yet all strong impressions seem to act very often more on the neighbouring parts than upon the brain or general system depending upon it.

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The action upon the neighbouring parts seem to be especially the exciting of the action of the blood-vessels of the part immediately adjoining to the organ of sense. Thus, a strong light excites a stronger action in the numerous blood-vessels intermixed with the nerves of the retina. What happens in the ear we do not know; but strong odours inflame the internal membrane of the nose, and strong and painful impressions upon the tongue inflame the surface of it. What happens on the skin I have mentioned before; and I gave that as an example of the action of stimulants, both on parts which are not organs of peculiar sense, and on those which have only the common sensibility of the nervous system. Such are also all the internal surfaces in which therefore we perceive only the effects of stimulants by their producing inflammation on their surfaces.

But we are now to consider the operation of stimulants upon the parts that are endued only with the sensibility that is in common to the whole of the system; and we cannot illustrate this better than by marking their action upon the skin.

When certain substances are applied to the skin, the first sensation they produce is that of heat in the part; and commonly at the same time some redness appears upon the surface, which I take to be a mark of an operation upon
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the blood-vessels of the skin. There is frequently, indeed, at the same time, a sense of pricking pain; yet often without that, the effect chiefly consists in an increased action of the vessels mentioned, and which accordingly proceeds to every circumstance of inflammation, as pain, tumour, blistering, suppuration, and gangrene. In many cases, some of these effects are produced in the part, without their being communicated to the rest of the system; and I consider them therefore as an immediate operation upon the moving fibres of the vessels of the skin, without the intervention of sensation or of any action of the brain.

It is indeed true, that, in many cases, a sensation arises, and that a stimulus is communicated to the brain, and the symptoms of its increased energy as a preternatural frequency of pulse; and, in consequence of this, an increase of heat over the whole body is produced. But it is to be remarked, as often happening, that the stimulus communicated to the brain is not in proportion to the inflammation produced in the part, which we have occasion frequently to observe in those paralytic cases in which we apply inflammatory stimulants to particular parts.

These are the general effects of stimulants on the parts to which they are immediately applied: but I am now to mention what is a very important particular of the animal œconomy, which is, that many stimulants have little effect on the

parts to which they are immediately applied, but excite motions in other, and sometimes very distant parts of the body. These motions, however, have commonly a relation to the parts to which the stimulus had been immediately applied; and they are commonly such as are suited for throwing off the stimulant matter from those parts.

Such are the motions of sneezing, hawking, coughing, vomiting, and the voiding of urine and feces. In all of these, the motions are excited by an uneasy or painful impression from a matter applied to certain parts; and the motions excited are manifestly fitted for throwing off the irritating matter from these parts.

These phenomena have been commonly explained upon the supposition of a certain consent of nerves between those of the parts irritated and of the parts acting; but no particular connection of nerves can be found that will account for the exciting of these actions, without their exciting at the same time many others; and it must be referred to an institution of nature which we cannot explain, and can only say, that the motions excited are suited to the general purpose of nature, either to resist and avert injuries from external causes threatening the animal œconomy, or to produce certain actions necessary to that œconomy. Of the latter kind are the evacuations of stool and urine; and of the former

former are the other motions of sneezing, hawking, coughing, and vomiting.

In illustration of this, it may be remarked, that the same actions are produced by stimuli applied to very different parts, if these actions are suited to the purpose, as we may call it, of these different parts. Thus a full inspiration and a concurring contraction of the abdominal muscles is produced by a stimulus applied to the stomach, or by an uneasy sensation at the neck of the bladder, or by a like sensation in the rectum.

These may separately excite the full inspiration; not therefore from any particular consent of nerves, but merely from its being necessary to the purpose of nature: and accordingly it is excited, not only on these occasions, but on every other where nature intends a strong exertion of strength, to which a full inspiration is always necessary.

It is farther to be remarked, that it is the administration of nature in the business of the animal œconomy, which not only excites those motions, but also regulates the force with which they are exerted to be more or less, according as the occasional circumstances may require. Thus, a sensation that excites to an evacuation of urine, if the urinary bladder be full, and there is no resistance to the issuing of the urine, the inspiration produced will be to a very moderate degree only; but if there is a resistance to the evacuation of urine,

the inspiration and other concurrent actions are excited to a greater degree and with greater force.

That the business in such cases is directed by the purpose of the œconomy, and not by the consent of nerves, appears further from hence, that it is not one set of actions, all of them constantly excited by the same stimulus, but more or fewer, according to the strength of effort that is necessary. Thus, the sensation exciting an evacuation by stool, according to the force on that occasion to be exerted, produces the action of more or fewer parts of the body. Not only a very full inspiration and a strong contraction of the abdominal muscles are produced, but a contraction, in order to a general tension, takes place in almost every muscular fibre of the body. The fists are clenched, or the hands grasp some fixed body very firmly; and even the muscles of the cheeks are often very strongly contracted.

There may seem to be some mystery in all this; but no body will be stumbled with respect to this part of the animal œconomy who considers the ordinary operation of the will. This does not directly or consciously direct the action of any particular muscle; but willing only an end and purpose, the muscles fitted to execute or produce this end are immediately brought into action.

The actions we have mentioned are the effects of stimuli, which we suppose to be powers exciting the motion of the nervous power; and
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though the effects are determined by the will or propensity, we still suppose the general power of the substance acting, and are therefore what we call direct stimulants. It is now, however, to be remarked, that there are motions excited in the body without the application of such stimulants, and by circumstances of a contrary kind; that is, merely by a sense of difficulty of resistance, or of debility, in the exercise of functions.

Thus, sighing manifestly arises from a sense of difficulty in the transmission of the blood through the vessels of the lungs. Coughing often arises from the same sensation, without any direct stimulus applied to any particular part of them. Vomiting often arises merely from a sense of debility, as when it accompanies a syncope, from causes which cannot be supposed to operate directly upon the stomach; and the vomitings so frequently produced by narcotics, seem to me to be more properly explained by a sense of the debility induced by them, than by their affording any direct stimulus. We explain in the same manner the yawning and stretching which occurs to persons coming out of sleep, and on some other occasions, when no other cause can be supposed than a sense of some difficulty in the exertion of voluntary motions.

These seem to afford unquestionable proofs of a power in the animal œconomy, to obviate and correct certain deviations from the standard of health; and both these, with the instances

given above of direct stimuli producing motion suited to throw off matters applied which give pain and uneasiness, or that may prove noxious to the system, concur in showing, that there is in the animal œconomy a power to obviate and correct, in a certain degree, every thing not suited to the health of the œconomy, and which has properly enough been named the *Vis Naturæ Conservatrix et Medicatrix*.

After so many evident instances of this, we can hardly doubt of the like powers taking place also in the more obscure internal parts, in many cases of disease which are spontaneously cured by the operations of nature; or in other words, by the spontaneous powers of the animal œconomy, and particularly that the state of the circulation is often regulated so as to be excited to a stronger action, merely by the occurrence of resistance or debility. All this particularly applies to render it probable, that the effect of sedatives, exciting the action of the system, either in general, or of particular parts, may be explained entirely by their being effects of a *vis medicatrix naturæ*, obviating injuries which threaten the whole system or particular parts: and to finish this subject, nothing can better show that active powers can be excited merely by a sense of debility, than this, that a stimulus accustomed to support the activity of the system, happening to be withdrawn, the sense of debility thence arising produces various ac-
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tions in the system, or in particular parts. All these means of exciting the action of the system, or of particular parts, we name Indirect Stimulants, as has been explained before.

After thus mentioning the operation of stimulants as chiefly applied to external parts, we proceed to consider their application to the internal; and which is especially by their being taken into the stomach. Here they may operate, in the first place, upon the moving fibres of the stomach itself, exciting their action for the purposes of digestion; or to a higher degree, for exciting vomiting, which we shall consider hereafter under the head of Evacuations: or, in the second place, stimulants may act on the stomach as a peculiar organ of sense. Here it is surely needless to say how readily and constantly all impressions made upon the stomach are communicated to other parts of the system, and particularly to the origin of the nerves.

The operation of stimulants taken into the stomach is not always exhausted there; for they are often carried on, very much unchanged, into the intestines; and there also operate, in the first place, upon the fibres of the intestines analogous to the like operations upon the stomach. They increase and render more steady the action of the moving fibres; and I have no doubt that the stimulant power from the intestines, as well as from the stomach, may be communicated to the
brain,

brain, though it is probable that the stomach is endowed with more sensibility suited to this purpose.

As many of our stimulants are very little changed in the alimentary canal, so they are carried with their entire power into the blood-vessels; and we are therefore to consider what may be their operation there. We judge it to be very little; 1st, Because they are there necessarily diffused in a great quantity of liquid, which must very much weaken, if not entirely destroy, their operation. 2dly, Because they are there involved in a quantity of viscid fluid; such as we know, in all cases, to weaken the action of stimulants. And, lastly, Because we believe the internal surface of the blood-vessels to have very little sensibility, and therefore little liable to be affected by weak impressions. From all these considerations, we consider the operation of stimulants, taken in by the mouth, to be in the blood-vessels very little; and know of no observation or experiment that leads us to think otherwise. I am of opinion, that any such effects as have been supposed can be better explained by their operation on the stomach and brain.

We still, however, know that many stimulant matters are carried into the blood-vessels, and are carried off by several excretions*: and as we

* As when strangury is produced.

may justly impute their inert state in the blood-vessels to their being there extremely diffused ; so, when they are again accumulated, and as it were concentrated in the secretory organs, they may there operate in promoting the different secretions.

Having now considered the operation of stimulants in general, I have only to conclude the subject with mentioning, that with regard to all of them, they are subjected to the laws of custom ; and that, therefore, considered as impressions, their power by repetition is constantly diminished ; but that, considered in their effects, the actions produced by the repetition may become more readily excited, and thereby the power of stimulants may seem to be increased.

OPIUM* AND ALCOHOL.

Opium and *alcohol* increase all the secretions and absorptions.

* *Purified Opium*.—This concrete gum resinous inspissated juice, derived from the *Papaver Somniferum*, is brought from the Levant in flat round casks, covered with leaves, to prevent their adhesion ; therefore is necessarily cleansed from those foreign matters by solution and colation. It contains a resin, essential oil, a principle of odour, and a soapy extract ; is of a darkish brown colour, and yields a faint smell and a bitterish taste. Opium is a very powerful remedy, and is a principal ingredient in many officinal compositions. It mitigates pain, procures sleep, allays irritability and spasms, and promotes perspiration ; particularly when joined with camphor, ipecacuanha, or some medicine of the diaphoretic class.

This valuable drug will not agree with every constitution ; it should therefore be administered with caution to those who are not accustomed to it. The general dose is from half a grain to 1 or 2 gr. and may be repeated or increased at proper intervals, in proportion to the degree

tions †. The increase of the secretion of sensorial power appears from the violent exertions of drunken people; the secretion of sweat is more certainly excited by opium or wine than by any other medicine; and the increase of general heat, which these drugs produce, is an evidence of their effect in promoting all the secretions; since an increase of secretion is always attended with increase of heat in the part, as in hepatic and other inflammations.

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gree of pain or spasmodic affection. The operation of a moderate dose is supposed to continue about six hours; but in cases of an increased painful spasm, it will be necessary to give a second dose in two or three hours time. It is soluble in every menstruum, but most so in proof spirit, which is allowed to dissolve three fourths of dried opium. The best mode of exhibiting it is in that of a pill with an equal quantity of hard soap, which divides its substance, and renders it more readily soluble in the stomach, and consequently quicker in its effect. The form of a watery solution is also an eligible mode of giving opium.

† *Highly Rectified Spirit.*—The kali, or alkaline salt, imbibes the remaining phlegm, and the disagreeable unctuous matter of the spirit, and carries them down to the bottom of the vessel. A few particles of the kali will be apt to rise, which may be prevented by adding a small piece of burnt alum, the acid of which unites with the kali, and forms a vitriolated kali, which remains in the cucurbit. The true specific gravity of alcohol is, to that of distilled water as 815 to 1000; whereas that of rectified spirit is, as 835 to 1000.

Rectified Spirit of Wine contains in 100 parts 95 of alcohol and 5 of phlegm, and a pound, by measure, should weigh 13 oz. Rectified spirits are applied as menstrea to extract the virtues of medicines, are the same from whatever subjects they are obtained, are separable from aqueous fluids by a heat less than boiling water, and dissolve essential oils; but expressed oils sink in them.

Spiritus Vinosus Gallicus, or the vinous spirit, called brandy, properly diluted, and occasionally taken, is a pleasant useful cordial, but when habitually drunk, will surely prove a destructive poison. Applied by itself, or moderately diluted with water, it dissipates the heat from inflamed parts without repelling the humour, which is not always the case with Goulard water.

Spiritus Vinosus Tenuior.—Proof spirit contains 55 parts of alcohol, and 45 of distilled water in 100 parts, and its specific gravity is as 930 to 1000 of distilled water. That which is prepared with rectified spirit and distilled water, is a more pure and certain menstruum than the proof spirit, which is drawn from various fermented liquors. Each of these spirits is denominated alcohol in the New Nomenclature.

But as they at the same time promote absorption; those fluids which are secreted into receptacles, as the urine, bile, intestinal, and pulmonary mucus, have again their thinner parts absorbed; and hence, though the quantity of secreted fluid was increased, yet as the absorption was also increased, the exertion from these receptacles is lessened; at the same time that it is deeper coloured or of thicker consistence, as the urine, alvine fæces, and pulmonary mucus. Whereas the perspiration being secreted on the surface of the body is visible in its increased quantity before it can be reabsorbed; whence arises that erroneous opinion, that opium increases the cutaneous secretion, and lessens all the others.

It must, however, be noted, that after evacuations, opium seems to promote the absorptions more than the secretions; if you except that of the sensorial power in the brain, which probably suffers no absorption.

In ulcers the matter is thickened by the exhibition of opium from the increased absorption of the thinner parts of it; but it is probable, that the whole secretion, including the part which is absorbed, is increased; and hence new fibres are secreted along with the matter, and the ulcer fills with new granulations of flesh. But as no ulcer can heal till it ceases to discharge; that is, till absorption becomes as great as the excretion; those medicines which promote absorption only, are more advantageous for the healing an ulcer after it is filled with new flesh; as the Peruvian bark internally; with bandages and solutions of lead externally.

There are many pains which originate from a want of due motion in the part, as those occasioned by cold; and all those pains which are attended with cold extremities, and are generally termed nervous. These are relieved by whatever excites the part into its proper actions, and hence by opium and alcohol; which are the most universal stimulants we are acquainted with. In these cases the effect of opium is produced, as soon as the body becomes generally warm; and a degree of intoxication or sleep follows the cessation of the pain.

These nervous pains (as they are called) frequently return at certain periods of time, and are also frequently succeeded by convulsions; in these cases, if opium removes the pain, the convulsions do not come on. For this purpose it is best

to exhibit it gradually, as a grain every hour, or half hour, till it intoxicates. Here it must be noted, that a much less quantity will prevent the periods of these cold pains, than is necessary to relieve them after their access. As a grain and half of opium given an hour before the expected paroxysm will prevent the cold fit of an intermittent fever, but will not soon remove it when it is already formed. For in the former case the usual or healthy associations or catenations of motion favour the effect of the medicine; in the latter case these associations or catenations are disordered, or interrupted, and new ones are formed, which so far counteract the effect of the medicine.

When opium has been required in large doses to ease or prevent convulsions, some have advised the patient to omit the use of wine, as a greater quantity of opium might then be exhibited; and as opium seems to increase absorption more, and secretion less, than vinous spirit, it may in some cases be useful to exchange one for the other; as in diseases attended with too great evacuation, as diarrhœa, and catarrh, opium may be preferable; on the contrary, in tetanus, or locked-jaw, where inflammation of the system might be of service, wine may be preferable to opium. I have generally observed, that a mixture of spirit of wine and warm water, given alternately with the doses of opium, has soonest and most certainly produced that degree of intoxication which was necessary to relieve the patient in the epilepsia dolorifica of Dr. Darwin.

There is likewise some relief given by opium to inflammatory pains, or those from excess of motion in the affected part; but with this difference, that this relief from the pains, and the sleep which it occasions, does not occur till some hours after the exhibition of the opium. This requires to be explained; after the stimulus of opium or of alcohol ceases, as after common drunkenness, a consequent torpor comes on; and the whole habit becomes less irritable by the natural stimuli. Hence the head-achs, sickness, and languor, on the next day after intoxication, with cold skin, and general debility. Now in pains from excess of motion, called inflammatory pains, when opium is given, the pain is not relieved till the debility comes on after the stimulus ceases to act; but then after the greater stimulus of the opium has exhausted much of the sen-
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sorial power; the less stimulus, which before caused the pain, does not now excite the part into unnatural action.

In these cases the stimulus of the opium first increases the pain; and it sometimes happens, that so great a torpor follows, as to produce the death or mortification of the affected part; whence the danger of giving opium in inflammatory diseases, especially in inflammation of the bowels; but in general the pain returns with its former violence, when the torpor above mentioned ceases. Hence these pains, attended with inflammation, are best relieved by copious venesection, other evacuations, and the class of medicines called sedantia hereafter to be explained.

These pains, from excess of motion, are attended with increased heat of the whole, or of the affected part, and a strong quick pulse; the pains from defect of motion are attended with cold extremities, and a weak pulse; which is also generally more frequent than natural, but not always so.

It must be observed, that a frequent repetition of the use of this class of medicines so habituates the body to their stimulus, that their dose may gradually be increased to an astonishing quantity, such as otherwise would instantly destroy life; as is frequently seen in those who accustom themselves to the daily use of alcohol and opium; and it would seem that these unfortunate people become diseased as soon as they omit their usual potations; and that the consequent gout, dropsy, palsy, or pimpled face, occur from the debility occasioned from the want of accustomed stimulus, or to some change in the contractile fibres, which requires the continuance or increase of it.

ÆTHER.

This is entirely an artificial substance, formed by a combination of alcohol with a concentrated acid. For a long time we were acquainted with it as formed with the vitriolic acid only; but we have since learned, that not only the other fossil acids of nitre and sea-salt, but that also the vegetable acid, may be managed so as to form an æther, or an oil of great volatility. Although we are only very well acquainted with the vitriolic æther, all of these formed of the other acids seem to be endued with the same antispasmodic power; and how far
this

this is anywise different in the different species, is not yet properly ascertained. They are employed in all spasmodic affections, whether of the whole system or of the alimentary canal; and the suddenness with which they are diffused gives them great advantages.

The following is an excellent formula :

R. *Æther. vitriol.*—*Spir. junip. comp.* a a, unc. $\frac{1}{2}$.—*Mist. camphor*, unc. 7.—*Pulv. gum arab. dr.* 2.—*℞t. Mist. cap. coch. larg.* 2, 2dâ. quâque horâ.

That is, take of vitriolated æther.—Compound spirit of juniper, equal parts, half an ounce.—Camphorated mixture, seven ounces.—Powder of gum arabic, two drachms.—For a mixture of which take two large table spoonfuls every two hours.

CANTHARIDES.

The acrimony of this insect, and, when applied to the skin, its inflammatory nature, which may be readily carried so far as to raise a blister, is well known to all the world; and the effects of its rubefacient and blistering powers, in the cure of many diseases, are known to every practitioner. These effects, however, are not to be taken notice of here. It is only the powers of the cantharides, when taken into the body, and employed as an internal medicine, that I am to consider.

The cantharides taken internally, whether in substance or in solution, if in a certain quantity, they may be considered as a stimulant and heating substance; and I have had occasion to know them, taken in large quantity, to have excited violent pains in the stomach, and a feverish state over the whole body.

The cantharides, however, seems to act only in a concentrated state; for taken in moderate quantity, it is so much diffused in the fluids, both in the alimentary canal and in the mass of blood, that it seldom shews any effects on the general system. But this seems to be almost peculiar to this substance, that, given even in moderate quantity, it very readily passes to the kidneys; and being thus in a concentrated state when carried on to the bladder, they give a considerable irritation and inflammation to the neck of it, in consequence of which
a fre-

a frequent stimulus to the voiding of urine, and a painful difficulty in the voiding of it; symptoms which are very well known to every medical man under the title of *Strangury*, are produced.

From the effects mentioned, it is sufficiently evident, that the substance of the cantharides goes to the kidneys; and it is with much probability supposed, that such a stimulus applied there must promote the secretion of urine. This effect, however, does not always in fact appear; and Dr. Smith Carmichael asserts, that in his frequent exhibitions of the tincture of cantharides, he never once observed the secretion of urine increased. In many instances of a strangury produced by the application or exhibition of cantharides, I have not found, though I have often enquired after it, the quantity of urine sensibly increased. And however it may be explained, though the substance of cantharides operates often upon the neck of the bladder, it may be doubted if at the same time it operates upon the kidneys; as, along with the strangury so often occurring, I have never met with pains of the back, or other marks of an affection of the kidneys.

From these observations, it may be doubted if cantharides have properly any diuretic power; but the authority of the late eminent and learned Werlhof cannot be declined. In the *Commercium Literarium Norimbergense*, Werlhof gives a remarkable instance of the diuretic power of cantharides, and informs us, that he had frequently experienced the same in dropsy and other diseases; and upon such an authority I can no longer doubt of the power in question.

It, however, may be considered, whether the obtaining the diuretic effects of cantharides may not depend upon that administration of them which Werlhof employed. He gave a grain of powdered cantharides for a dose, and repeated this every four hours; and it was only after the third dose, that a suppression of urine, of many days standing, began to yield: and I will give the rest of what relates to this subject in his own words, *Operum*, pag. 699. “*Post tertium granum*
“*fluere urinā parum grumos sanguinolenta, dein pituitosa, tan-*
“*dem limpida coepit, cum dysuria. Continuavi, quia symp-*
“*tomata cetera statim mitigata sunt, medicaminis usum, ad*
“*unam usque dosin: quo facto magis magisque, et tandem lar-*
“*gissime*

“gissime ad plares indies mensuras sine febre, dolore, prodiit
 “urina limpida, imminutis symptomatis omnibus, sensimque
 “sola ejus remedii usque, convaluit homo, jamque sanus
 “vixit.”

Cantharides have been frequently employed in the cure of cutaneous diseases, and are for this particularly recommended by Dr. Mead; and as they may justly be supposed to pass by perspiration as well as by urine, the instances given of their utility may be very true. My learned friend Dr. Smyth Carmichael, amongst other attempts which he thought of for the cure of cutaneous diseases, very properly thought of trying the cantharides. In one case they proved a remedy; but in some others, though given in large quantities, they entirely failed; and, so far as I know, the experiment has not been prosecuted further.

This is an excellent liniment:

R. Linim. sapon comp. unc. 1½.—Tinct. cantharid. unc. ½.
 —Ft. Linimentum, quo pars dolens fricetur sing. noct.

That is, take of the compound soap liniment, an ounce and a half.—Tincture of cantharides, half an ounce.—For a liniment, with which the painful part is to be rubbed every night.

RAPHANUS RUSTICANUS.

Horse-Radish.—The root of this only is employed; and it affords one of the most acrid substances of this order, and therefore proves a powerful stimulant, whether externally or internally employed. Externally, it readily inflames the skin, and proves a rubefacient that may be employed with advantage in palsy and rheumatism; and if its application be longer continued, it brings on a blistering, with the effect I formerly mentioned.

Taken internally, I have said in what manner its stimulant power in the fauces may be managed for the cure of hoarseness. Received into the stomach, it stimulates this, and promotes digestion, and therefore is properly employed as a condiment with our animal food. If it be infused in water, and a portion of this infusion be taken with a large draught of warm
 water,

water, it readily proves emetic, and may either be employed by itself to excite vomiting, or to assist the operation of other emetics.

Infused in wine, and taken into the stomach, it proves stimulant to the nervous system, and is thereby useful in palsy; and if employed in large quantity, it proves heating to the whole body: and hereby it proves often useful in chronic rheumatism, whether arising from scurvy or other causes. Bergius has given us a particular method of exhibiting this root, which is by cutting it down, without bruising, into very small pieces; and these, if swallowed without chewing, may be taken down in large quantity, to that of a table spoonful: and the author alledges, that in this way, taken every morning, for a month together, this root has been extremely useful in arthritic cases; which, however, I suppose to have been of the chronic rheumatic kind.

It would seem, that in this manner employed, analogous to the use of unbruised mustard-seed, it gives out in the stomach its subtle volatile parts, that stimulate considerably without inflaming. The matter of horse-radish, like the same matter of the other siliquose plants, carried into the blood-vessels, passes readily to the kidneys, and proves a powerful diuretic, and is therefore useful in dropsy; and we need not say, that in this manner, by promoting both urine and perspiration, it has been long known as one of the most powerful antiscorbutics.

SINAPI.

Mustard.—The seeds of this are the part only employed; and it has been common for the purpose of medicine to distinguish two kinds of it, the *Sinapis Nigra* and the *Sinapis Alba*; which though they seem to be of different species, hardly differ in their sensible qualities, and for every purpose may be indifferently used.

This seed contains a volatile part very pungent to the smell and taste. Treated by distillation with water, it gives out an essential oil which discovers the same acrimony that is found in the whole substance, and shews that the acrimony of this depends upon that. The same substance contains also a portion

tion of mild oil, which may be obtained by expression from the powdered seed : and when this is done, the acrid and active parts are found in the paste that remains after the expression of the mild oil.

In these seeds there is a large portion of farinaceous matter, capable of fermentation, under which the volatile oil is more evolved, and shews its activity more readily : hence it is that the fresh powder shews little pungency, and a good deal of bitterness ; whereas, when it has been moistened with vinegar, and set by for a day, it becomes considerably more acrid, as is well known to those who prepare mustard for the use of the table. This applies also particularly to its external use. Mustard, any how moistened and applied to the skin, will become in time rubefacient and blistering ; but as prepared for the table, it is more immediately active than the fresh powder ; and therefore we have done improperly in ordering the fresh powdered mustard in our sinapisms, as the table-mustard would be much more quickly effectual.

Mustard thus applied externally has all the powers of the horse-radish mentioned in the last article ; and I am much surprised that the learned Professor Murray should assert, that mustard stimulates the system less than the ordinary vesicatories ; that is, as I suppose, than cantharides : but to me the business seems quite otherwise. Mustard, in its powdered state, taken internally, has all the powers and effects of the other siliquosæ ; but they are here more active and powerful than in almost any other, except it may be the *raphanus rusticus* last treated of.

A practice, so far as I can learn, first begun in this city about fifty years ago, has been since very frequent. It consists in giving the mustard-seed entire and unbruised, to the quantity of half an ounce, or as much as an ordinary table-spoon will contain. This does not prove heating in the stomach ; but stimulates the intestinal canal, and commonly proves laxative, or at least supports the usual daily excretion.

The following is an excellent formula :

R. Sinap. sem. contus.—*Raphan. rust. incis.* aa, dr. 6.—Aq. fervent. lb. 1.—Macerate in vase aperto et liquorem cola, cui addantur spir. pimento, unc. 2.—Sumantur cochl. larg. 3, bis terve indies.

That

That is, take of bruised mustard seeds.—Sliced horse radish, equal quantities, six drachms.—Boiling water, a pint —Macerate in a close vessel, and strain off.—To which add six ounces of pimento.—Let three table spoonfuls be taken twice or thrice a day.

ALLIUM SATIVUM.

The medicinal qualities of garlic are very considerable; and I take notice of them first as they are externally applied. Garlic bruised and applied to the skin readily inflames it; and applied for some time will raise a blister, as we have said of mustard and horse-radish: but the effects of the blistering are not so permanent nor so slow in healing from the garlic as from the siliquosæ. It may however be a question, whether the very diffusible nature of the garlic may not in some cases give a more immediate and considerable stimulus to the whole system than the siliquous substances do?

Garlic, taken into the stomach, seems to stimulate this organ and favour digestion, and may therefore be considered as an useful condiment of our food; but both its odour and taste are so disagreeable to many persons, that in many cases they are inadmissible: but as in warm climates it is said to be much milder both in smell and taste, it may in these be more frequently and largely employed.

Even in its most acrid state, it is admitted into many of our sauces in small proportion. Its diffusible odour is very readily and largely communicated to the air of the stomach; and therefore affects not only the eructations, but even the ordinary exhalations, pretty constantly arising from that organ. It is thereby often disagreeable to the persons who have eaten it, and more so still to bystanders; but all this may be somewhat corrected by some volatile aromatics which have been at the same time taken in, or brandy.

Its stimulus is more readily and quickly diffused over the system than that of almost any other substance known. It not only affects the perspiration and secretion of urine, but seems to pervade every vessel of the system: and Bennett's account of its effects appearing so suddenly in issues, is a strong proof of this. By its stimulus being thus diffusible and powerful, it

certainly may be useful in many diseases; as, wherever there is a languor of the circulation in any part, or wherever there are interrupted secretions. Accordingly, its diaphoretic and diuretic powers have been often useful in dropsy. Dr. Sydenham found some dropsies cured by garlic alone.

As taken in any manner, and even as externally applied, it so readily appears in the vapour arising from the lungs, there can be no doubt of its promoting the secretions, and therefore the exhalations, from that organ. Its use therefore, in pituitous asthma, and even in spasmodic asthma requiring expectoration, will be readily admitted; and I am ready to allow what has been asserted, that even in its external application to the soles of the feet, it has been useful in those diseases.

Bergius takes notice of a particular virtue of garlic in the cure of deafness; and I am ready to believe it, as I have myself several times found the use of onion in such cases very useful. Bergius's manner of using the garlic it will be proper to give in his own words: "In chronic deafness advantage is often derived by immersing an end of silk in the juice of garlic, and this is to be introduced into the ear at different intervals during the day. The meatus auditorius thence inflames, and becomes painful for a day or two, suppurates, and desquamates, hearing at this period often returning."

Garlic, as a medicine, is employed in different forms. Sometimes the cloves dipped in oil are swallowed entire; and in this way a number of cloves may be taken at the same time, without proving warm on the stomach, though manifestly acting on the system as diuretic and otherwise. This I take to be the administration of Bergius in the cure of intermittents. For persons who cannot swallow the entire cloves, they are cut down without bruising into small pieces; and in this way a considerable quantity, if swallowed without being chewed, may be taken at once, and without proving very warm in the stomach, although it be found to be an active medicine. When the garlic cannot, in any of these ways, be taken in a somewhat entire state, it is to be bruised; and, with powders coinciding with the intention of the garlic, the whole is made into pills: but it is not a very proper formula for long keeping, as the active parts of the garlic are readily dissipated by drying. These active parts are more certainly preserved by
infusing

infusing the bruised garlic in warm water, and after a due infusion making the liquor into a syrup or oxymel in the manner of the London Dispensatory. In this form the garlic is considerably powerful; but cannot be taken in any considerable quantity, without irritating the fauces, and even the stomach.

SCILLA.

This is a root which from the most ancient times has been celebrated as a diuretic; and, under a proper management, it seldom fails to operate more or less as such. It has not however any specific power, as it seems to be universally stimulant with respect to every sensible part or excretory to which it is applied. It readily stimulates the stomach, and proves emetic, as we observed above when speaking of it under that title. When it is so managed as to pass the stomach, it stimulates the intestines, and proves purgative; and when carried into the mass of blood, it is generally, and I believe justly, supposed to stimulate the mucous glands of the lungs, and to prove an expectorant.

When it is thus so generally stimulant, we can readily understand why it should prove a diuretic; and I would add, that probably it has something in the nature of the acrimony, it contains, that suits it to be taken up by the serosity, and thereby to pass readily by the kidneys, where its acrimony therefore increases the secretion.

This actually happens, and has rendered it at all times noted as a diuretic.

This effect, however, does not always happen; because, if it be thrown into the stomach in such quantity as to prove emetic or purgative, it is thereby prevented from reaching the blood-vessels and kidneys; and therefore to obtain its diuretic effects, we must avoid its emetic and purgative operations, which may commonly be done by giving the squills in small doses, to be repeated after proper intervals only: and I have found, that by accompanying the squills with an opiate, the emetic and purgative operation of it may be avoided, and thereby it may be carried more entirely to the kidneys.

A certain writer has alleged, that the diuretic effects of the

squill is not to be expected unless it shows some operation on the stomach. This may perhaps be founded; but I understand it no other ways than that some operation on the stomach is a test, and a necessary test, of the squills being in an active state; in the same manner as we are only certain of the activity of mercurial preparations when they have shown some effect in the mouth.

I have often observed, that when the squill operates strongly in the stomach and intestines, that the diuretic effects were less ready to happen; and therefore, as the squill contains an acrimony that is in part very volatile, and which is most ready to act on the stomach, that therefore the fresh squill, by acting more upon the stomach, is less certainly carried to the kidneys than when their volatile part is in some measure dissipated.

It is on this account that the dried squill is more frequently employed than the fresh. We must not however fail to observe here, that the drying of the squill is a business that requires much attention, as it may readily be overdone, and thereby render the squill entirely useless: and it is to be observed also, that the squill may not only be rendered inert by the first drying being too much, but that the dry powder, if kept long in a dry air, may also in time lose much of its power.

This overdrying of the squill, in one way or other, happens more frequently than our apothecaries are aware of; and has led me to allow, that some operation on the stomach, some nausea excited by the squill, is a necessary test of the activity of the portion employed.

When the squill is in good condition, to avoid its operation on the stomach and intestines, I have said it is proper to give it in small doses, to be repeated after long intervals only; but it is proper to observe here, that when the disease requires a repetition, the doses of the squill, as they are repeated, may be gradually increased, and the intervals of their exhibition made shorter; and when they come to be tolerably large, it is then that an opiate may be conveniently employed in directing the operation of the squill more certainly to the kidneys.

In the case of dropsy; that is, when there is an effusion of water into the cavities, and therefore that less water goes to the kidneys, we are of opinion that a neutral salt accompanying the

the squill may be of use in determining this more certainly to the kidneys: and whenever it can be perceived that it takes this course, we are persuaded that it will also be always useful, and generally safe, during the exhibition of the squills, to increase the usual quantity of drink.

It may be a question, whether the diuretic operation of squills may not be assisted by some mercurial preparation given at the same time? and when there is any appearance of the medicine going to the kidneys, it cannot be doubted that the mercury, as stimulant of every excretory to which it is applied, may here also be useful. Accordingly it has been a frequent practice to join mercury with squills; but I doubt much if the common practice of employing calomel on this occasion be proper. Calomel determines the squill more certainly to operate by stool; and unless the cure of the disease is trusted entirely to purging, the calomel may readily prevent the diuretic operation of the squill. We have therefore been of opinion that the less purgative preparations of mercury were better suited to the purpose; and we are disposed to judge that the solution of the corrosive sublimate, which so often by itself goes to the kidneys, may be more proper than any other.

The following are excellent formulæ:

R. Scill. recent. exsicc. pulv. gr. 4.—Tart. crystal. pulv. ser. 1.—Ft. pulv. nocte maneque sumend. ex seri lactis poculo.

That is, take of fresh squills dried in powder, four grains.—Crystals of tartar, one scruple.—Make into a powder to be taken night and morning in a cup of whey.

R. Cons. scillæ. dr. $\frac{1}{2}$.—Calomel. gr. 2.—Opii purif. gr. $\frac{1}{2}$.—Ft. Bolus horâ somni sumend.

That is, take conserve of squills, half a drachm.—Calomel, two grains.—Purified opium, half a grain.—For a bolus to be taken at bed time.

R. Pill. scillæ. gr. 10.— — Hydrarg. gr. 5.—Ft. pil. 3. omni nocte sumend.

That is, take of squill pill, ten grains.—Mercury pill, five grains.—To be made into three pills, to be taken every night.

The above formulæ are usually employed in dropsy.

R. Ammoniac gum. pulv. scill. recent. aa dr. $\frac{1}{2}$.—Ft. pil. 12.
Sumant. tres, bis terve quotidie.

That is, take of gum ammoniac, fresh squills, equal quantities.—Make into 12 pills, three of which are to be taken twice or thrice a day.

R. Lact. ammoniac. unc. 5.—Oxymel scill.—Tinct. opii camphor. aa unc. $\frac{1}{2}$.—Capt. coch. duo. sexta quâque horâ.

That is, take of milk of ammoniac, five ounces.—Oxymel of squills.—Camphorated tincture of opium, of each half an ounce.—Two table spoonfuls are to be taken every six hours.

The three last formulæ are employed to relieve difficult respiration.

SALES ALKALINI.

It is not necessary to observe, that the volatile alkaline salts were formerly drawn from various animal substances, and supposed in consequence to have peculiar virtues; but now the chemists have learned, that from whatever substances they may be extracted, they may be brought to such a degree of purity as renders them hardly different from one another. They are still however prepared in two different ways; the one of which is from sal ammoniac, which gives the ammonia of the London Dispensatory, or the sal ammoniacus volatilis and spiritus salis ammoniaci of the Edinburgh.

These are certainly the purest forms of the volatile alkali, the most free from any adhering animal substances; but while the trade continues preparing a volatile alkali from the bones or other solid parts of animals, there will come into our shops a salt and spirit that can hardly ever be so pure from some empyreumatic animal substance adhering: and it is a question with me, whether such an adherence may not give some peculiar quality to the salt and spirit. I believe it does so, and may render it more antispasmodic. This indeed cannot go far in any doses of the salt or spirits given to adults; but it may go much further as employed in the spasmodic affections of infants.

The liquid volatile alkali is commonly employed in its mild state;

state; but by a distillation of the sal ammoniac with quicklime, the alkali obtained may be in its caustic state. In this state it may be readily joined with spirit of wine, and gives the spiritus salis ammoniaci dulcis of the Edinburgh Dispensatory, or the spiritus salis ammoniaci vinosus of the London. The combination affords an excellent menstruum for dissolving the several fetid substances employed as antispasmodics, and renders them more suddenly diffusible, and perhaps of more effect, in all spasmodic affections.

The caustic volatile alkali is seldom employed by itself; but if its acrimony be covered while it passes the mouth and fauces, it may be employed with great safety. Its chief use, however, is when employed externally; and when smelled at the nose, gives a more powerful stimulus than the mild alkali can do. Its acrimony is so considerable, that when applied to the skin, it readily irritates, and even inflames it; and may be so managed as to prove an useful stimulant and rubefacient in many cases. But this requires its being blended with a mild expressed oil, in such proportion as to prevent its inflaming too much; and in this state it may be employed with great advantage, and particularly in paralytic cases, with more advantage than the acids we mentioned before for that purpose.

Practitioners are now well acquainted with the use of this combination, under the name of the Volatile Oil, and find it useful in relieving all pains arising from rheumatism, when the skin is not already affected with redness; and it is even useful in relieving pains of the flatulent kind. This combination, to be very useful, requires to be made of one drachm of good caustic alkali to an ounce of the oil; and it may even go frequently with advantage to double that quantity. Let apothecaries observe, that if the alkali does not entirely and intimately unite with the oil, and remain constantly united with it, it is a mark that the alkali was not sufficiently caustic.

The following are the best formulæ:

R. Ammon. præp. gr. 6.—Tinct. cardam. com. dr. 1.—Aq. pulv. dr. 11.—Syr. cort. aur. dr. 1.—Ft. haustus, sextâ quâvis horâ capiendus.

That is, take of prepared ammonia, six grains.—Compound tincture of cardamon, one drachm.—Penny royal water, ten drachms.

drachms.—Syrup of orange peel, one drachm.—For a draught to be taken every four hours.

R. Spir. ammon. succin. gtt. 20.—Mixt. camphor. dr. 11. Spir. lavend. comp. dr. 1.—F. *Haustus bis terve quotidie sumendus.*

That is, take of succinated spirit of ammonia, twenty drops.—Camphorated mixture, eleven drachms.—Compound spirit of lavender, one drachm.—For a draught to be taken twice or thrice a day.

R. Spir. ammon. comp.—Spir. lavend. comp.—Tinct. castor. aa unc. 1.—Cap. coch. parvulum, ex pauxillo aquæ fontanæ sub languore.

Compound spirit of ammoniac.—Compound spirit of lavender.—Tincture of castor, equal quantities, an ounce. Take a tea spoonful in somewhat whenever extremely low.

R. Liq. volat. corn. cerv. gtt. 20.—Tinct. colomb. dr. 1.—Aq. cinnam.—Aq. distillat. aa dr. 6.—F. *haustus horâ xi. matutin. et horâ vii. vespere, quotidie sumendus.*

That is, take of volatile liquor of hartshorn, twenty drops.—Tincture columb. one drachm.—Cinnamon water,—Distilled water, of each, six drachms.—For a draught to be taken at eleven and at seven every day.

R. Sal. ammon. pulv. scr. 2.—Spir. Piment. unc. 1.—Aq. distillat. unc. 4½.—Syr. suc. limon. unc. 3.—Capt. coch. larg. 3, ter indies.

That is, take of sal ammoniac in powder, two scruples.—Spirit of pimento, one ounce.—Distilled water, four ounces and a half.—Syrup of lemon juice, half an ounce.—Take three table spoonfuls three times a day.

R. Aq. ammon. acetat. unc. 1.—Spir. vinos. rect. unc. 2.—Ft. embrocatio.

That is, take of acetated water of ammonia, six ounces.—Rectified spirits of wine, two ounces.—For an embrocation.

PINUS.

Turpentine in its entire state is an acrid substance, and when applied to the skin inflames it to a considerable degree. It might perhaps by itself be an useful rubefacient, but when we would prevent its operation from going too far, it is not easy to wash it off the skin. When it was employed in the emplastrum volatile of the former editions of the Edinburgh Dispensatory, it proved a very powerful rubefacient, more powerful than that of the volatile alkali combined with expressed oils. The Canada, and other balsams, have the same virtues, when taken internally. They are usually employed in fluor and choloris and seminal weaknesses.

The formulæ are:

R. Balsam. Canad. dr. 3.—Vitel. ovi. q. s.—Probé subactis, admisce sensim, mel. despumat. dr. 3.—Aq. cinnam. unc. 3.—Sumat æger, quolibet quadrihorio, cochleare unum; semper autem ante usum concutiatur phiala.

That is, take of the Canada balsam, three drachms.—The white of an egg, as much as is sufficient. After these are intimately united, add clarified honey three drachms, cinnamon water, three ounces. Let the sick person take a large table spoonful every four hours, shaking the bottle first before using it.

R. Bals. copaiv.—Spir. vinos. rectific. aa, dr. 4.—Capt. gtt. 40, ter in die ex lactis novi cyatho.

That is, take of balsam of copaiva and rectified spirit of wine equal parts, four drachms. Forty drops are to be taken three times a day in a cup of new milk.

R. Bals. copaiv.—Olibar. in pulv. trit. aa, dr. 2.—Cons. cynosbat. unc. $\frac{1}{2}$.—Ft. Elect. de quo, bis terve in die, ad nucis moschatae magnitudinem capiatur.

That is, take of balsam of copaiva and olibanum reduced to powder, of each two drachms, conserve of hips, half an ounce, make into an electuary, of which take the size of a nutmeg twice or thrice a day.

R. Bals.

R. Bals. Peruv. dr. 2.—Ol. amygdal. unc. 1.—Syr. alth. unc. $\frac{1}{2}$.—Vitell. ovi unius.—Bene terantur simul, dein sensim admiscantur, aq. font. unc. 6.—Capiat bis die unciam unam.

That is, take of balsam of Peru, two drachms, oil of almonds, one ounce, syrup of marsh-mallows, half an ounce, the white of one egg. Let these be well mixed together, when gradually add six ounces of water.—One ounce is to be taken twice a day.

JUNIPERUS.

It contains, minutely diffused through its whole substance, an essential oil very much the same with that of turpentine, only of a more agreeable odour. It is manifestly diuretic, and imbues the urine with the same violet smell that the turpentine do.

The part of juniper chiefly employed in medicine is the berry; which, especially as produced in somewhat warmer climates than ours, contains, diffused over their whole substance, particularly in their seeds, the essential oil I have mentioned in larger quantity. In the common employment of the juniper berries, unless pains are taken, by a strong contusion, to break these seeds, the infusion is an agreeable, but a weak, impregnation; and therefore of very little power as a medicine.

When spirit of wine is applied to these seeds, it extracts the essential oil from the husk, pulp, and bruised seeds very entirely, and carries them over with it in distillation. By this it proves a diuretic, but to my observation never a very powerful one; and when largely used, proves more hurtful by the menstruum than useful by the diuretic quality of the impregnation. To many persons, especially after the repeated use of it, the proper odour of the juniper berries is sufficiently agreeable; but to others it must be rendered so by the addition of some other aromatics, as in the aqua juniperi composita.

R. Bac. junip. contus. unc. 2.—Aq. fervent. lb. 1.—Macerate et liquor. colat. adde spir. piment. unc. 2.—Cap. coch. larg. 3. ter quaterve indies.

That

That is, take of juniper berries bruised, two ounces, boiling water a pint. Macerate and strain off, and add to the strained liquor two ounces of spirit of pimento.—Take three large table spoonfuls three or four times a day.

MOSCHUS.

The natural history of the animal producing this peculiar substance I must leave to others, as it is of no consequence to our purpose to determine, whether it be of the goat or of the hart kind. I would wish to enter into its chemical history; but the chemists have not gone far on this subject. *It is a remarkably odoriferous substance; and this seems to depend upon what may be called an essential oil, as it arises with distillation in water.

Its medicinal property I consider as entirely depending upon its being a very odoriferous matter, which in all cases seems to be powerful in acting upon the nerves of the human body. As, however, we do not yet know any certain means of extracting its odoriferous parts; so the first thing to be remarked with respect to its medicinal qualities is, that it is more effectual given in substance than under any preparation that has been attempted. In substance it is to be given in large doses, from ten to thirty grains; and even when these large doses are found to be effectual, they must be repeated after no long intervals till the disease is entirely overcome.

While I am mentioning the doses of musk, it is proper to remark, that these will depend upon the quality of it, which is at different times in very different condition. Whether this is owing, as has been alledged, to a more imperfect condition in the original musk, or to an adulteration frequently practised upon it, I cannot certainly determine; but certainly such differences do occur, and I have therefore very often found it to be an ineffectual medicine. I judge of it always by the strength of its odour, and in proportion to this only to be an effectual remedy. I was once called to a patient in the night-time, under violent head-ach and delirium arising from gout, for which I ordered fifteen grains of musk, but without giving my patient

patient any relief. In the morning, however, the disease continuing the same, as I had learned where some good and genuine musk was to be had, I ordered a like dose of this, and thereby obtained the immediate relief of my patient. From many such instances of the difference of musk, I must inculcate upon all practitioners, that genuine musk is a very powerful medicine, and that they should not doubt of its efficacy on any occasion, without their being certain that the failure was not owing to the imperfect state of the drug. I must add, that the imperfect state of musk is not compensated by a larger dose.

With such precaution in the choice of it, I maintain that musk is one of the most powerful antispasmodics that we are acquainted with. I have found it, with Dr. Wall, to be a powerful remedy in many convulsive and spasmodic affections, and in some of a very peculiar kind. I had once a gentleman affected with a spasm of the pharynx, preventing deglutition and almost respiration. This, when other remedies had failed, was relieved by the use of musk, which often showed its power; for the disease continued to recur at times for some years after, and was only obviated or relieved by the use of the musk.

In another disease I can vouch for the powers of musk, and that is in several circumstances of the gout. The case given by Mr. Pringle, in the *Physical and Literary Essays*, Vol. II. Art. 12, are very much in favour of its virtues: and in several instances of the gout attacking the stomach, I have found it relieved by large doses of musk. I gave above an instance of head-ach and delirium, arising from the gout, being cured by it; and in the same person I had repeated instances of its power. This person being frequently affected with the gout, was liable to have it retrocedent, and affecting the stomach, the lungs, and particularly the head, in the manner above-mentioned; and in many of these instances it was very suddenly relieved by large doses of musk, or by these at least repeated after short intervals; though at length the great irregularities of this patient brought the disease into a state that resisted all remedies.

It seems to be adapted to these cases of convulsive disorder which I have said above are to be cured by opiates; and indeed

deed the success I have generally had with these has prevented my having further experience of the musk.

Vide the next article for the formulæ.

CASTOREUM.

This also is an animal production, the natural history of which the public are well acquainted with. It is a pretty strongly odoriferous substance, of the disagreeable kind; and to this we ascribe its medicinal powers. It is certainly on many occasions a powerful antispasmodic, and has been useful almost in every case requiring such remedies, especially when given in substance, and in large doses, from ten to thirty grains. It has been supposed by some to have somewhat of a narcotic power; but I have never perceived this, excepting where such effects might be imputed to its removing the spasmodic affections which interrupted sleep. Its medicinal virtues are best extracted by a rectified spirit, as it is probable that this extracts most powerfully the odoriferous oil, upon which the medicinal quality probably depends.

The Edinburgh College are of this opinion; but the London College prefer a proof-spirit. The latter may give a medicine to be employed more conveniently in a larger dose than the former; but neither of them, in my opinion, can admit of doses of much efficacy. Either of them may give a medicine to be suddenly diffused, and therefore of use in spasmodic affections; but if that is the intention of the practitioner, it will be most certainly obtained by employing the compound tincture of castor, as prescribed by the Edinburgh College.

R. Mist. moschat.—Dosis cochl. 3, sexta quâque horâ. *

Musk mixture.—The dose is three table spoonfuls every six hours.

R. Mosch.—Castor. $\overline{\text{aa}}$ scr. 1.—Ft. boli numero duo, quorum alter mane, alter vespere sumatur, ex mist. camphor. unc. 2.

That is, take of musk.—Castor, of each a scruple.—Conserve of hlsps, one drachm.—Make into two bolusses, one of which is to be taken in the morning, and another in the evening, in two ounces of camphorated mixture.

ASAFŒTIDA.

This, when in a tolerably recent and genuine state, is a most valuable medicine. This depends upon the force of its odour, and upon that odour's being of a very diffusible kind, and which I believe therefore penetrates the nerves more readily than any other vegetable odour. All this explains its being a powerful and suddenly operating antispasmodic. Accordingly I have found it to be the most powerful in all hysteric cases; and when the presence of an hysteric paroxysm prevented medicines being taken by the mouth, I have found it, given in glyster, to be very effectual. When taken into the stomach it is particularly useful in relieving those spasmodic complaints which so frequently attend dyspepsia; and as it has manifestly a laxative power, it is well suited to relieve the flatulent colics of hysteric and hypochondriac persons.

It is in some measure suited to relieve the spasmodic asthma; but as the spasm in these cases is of an obstinate kind. I have seldom found the asafetida of much service in asthmatic paroxysms.

As all the fætid gums seem to be determined to the lungs, and to promote expectoration; so I have found the asafetida the most powerful for this purpose, and more powerful than the ammoniac so frequently employed.

The asafetida is employed in various forms, as it may be given in its solid form, or may be extracted by either watery or spirituous menstruums, and especially as its virtues rise in distillation with those of the latter kind.

In a solid form it seldom acts as a powerful antispasmodic; and therefore, excepting where it is so be joined with aloes or other medicines, I seldom employ it in this state.

When it is to be employed as an antispasmodic, and especially where a sudden operation is required, the form of tincture or volatile spirit are the most proper. As the frequent
repe-

repetition of the same antispasmodic is ready to weaken its powers, so some variety of formulæ, and of combination with other antispasmodics, may be necessary.

For the purposes just now mentioned, I hold the spiritus volatilis fœtidus of the Edinburgh College, or the spiritus ammoniæ fœtidus of the London, when they can be conveniently given in large doses, to be the most powerful formulæ; but much of all this must be left to the discretion of practitioners.

Pil. galban. comp.—Dosis a granis decem ad scrupulum unum bis quotidie.

Compound Galbanum pill.

The dose is from ten grains to a scruple twice a day.

R. Lact. asæfœtid. unc. 5½.—Spir. lavend. comp. unc. ½.—Spir. ammon. comp. dr. 2.—Sumant. ter quotidie coch. tria.

That is, take of milk of asafœtida, five ounces and a half.—Compound spirit of lavender, half an ounce.—Compound spirit of ammoniac, two drachms.—Take three table spoonfuls three times a day.

VALERIANA SYLVESTRIS.

This is a root of much virtue and deserved reputation. It has been almost at all times in esteem, but particularly since the time of Fabius Columna. In the condition we have it, in different shops and at different times, I have found the sensible qualities of it to be very different; and I am persuaded, that unless it is taken up at a proper season, and properly preserved, it is often a very inert substance.

I do not conclude from its singular power with respect to cats, that it must have peculiar powers with respect to the animal œconomy; but I consider its more or less activity with respect to cats, which is different at different times, to be a test of its active powers in general.

Its antispasmodic powers in general are very well established, and I trust to many of the reports that have been given of its efficacy; and if it has sometimes failed, I have just now accounted for it, adding only this, that it seems to me, in almost all cases, that it should be given in larger doses than is com-

commonly done. On this footing, I have frequently found it useful in epileptic, hysteric, and other spasmodic affections. It seems to be most useful when given in substance; and in large doses I have never found much benefit from the infusion in water.

The London college have attempted a tincture strongly impregnated; and I have attempted one still stronger, by taking the root in double the quantity, and straining the tincture by a strong expression: and this, I have found, in persons who cannot bear a large dose of the menstruum, is a powerful remedy, and suddenly operating. The volatile tincture prescribed by both colleges, is often, as suddenly operating, an effectual remedy, and gives an excellent variety of antispasmodic formulæ; but whatever may be the efficacy of the valerian, the menstruum here has certainly a share in it.

Tinct. valer. ammon.—Dosis a drachmâ unâ ad unciaë dimidium ter quotidie, ex cyath. aq. menth. pip.

That is, take of ammoniated tincture of valerian.—The dose from one to four drachms three times a day in a cup of peppermint water.

R. Valerian. pulv. unc. 1.—Syr. aur. cort. q. s.—Ft. elect. cujus detur coch. min. unum vel alterum, ter indies, ex aliquot uncis aq. pulegii.

That is, take of powder of valerian, one ounce.—Syrup of orange peel, as much as is sufficient.—Make an electuary, of which a small tea spoonful or two is to be taken three times a day in some peppermint water.

R. Valerian. pulv. dr. 2.—Pulv. aromatic. dr. $\frac{1}{2}$.—Spir. ammon. comp. dr. 1.—Aq. cinnam. unc. 1.—Aq. menth. pip. unc. $3\frac{1}{4}$.—Ft. Mist. cap. coch. larg. 2 ter quaterve, indies.

That is, take of powder of valerian, two drachms.—Aromatic powder, half a drachm.—Compound spirit of ammonia, one drachm, cinnamon water, four ounces.—Peppermint water, three ounces and a half.—For a mixture. Take two large table spoonfuls three or four times a day.

MYRRHA.

Myrrh.—This is a gummy resin, which has long been considered as a valuable medicine, and seems intitled to some esteem by its sensible qualities, and by the acrid matter that a chemical examination shows it to contain.

Its proper virtues, however, seem to me to have been mistaken. It manifestly stimulates the stomach, and, when taken in moderate quantity, promotes appetite and digestion; but taken in larger quantity, as in half a drachm or two scruples for a dose, it raises a disagreeable sensation of heat in the stomach, and at the same time occasions a frequency of pulse and a sense of heat over the whole body. From this power, it may sometimes be useful in that flaccidity of the system, which is so often connected with a retention of the menses; but we cannot perceive that it has any peculiar power of determining to the uterine vessels, and therefore that it has not any title to be supposed, as it has usually been, an emmenagogue. By its sensible qualities, it has not even so much pretension to an antispasmodic as the fetid gums.

R. Myrrh. pulv. scr. 1.—Kali ppti. gr. 3.—Cons. cort. aur. scr. 1.—Syr. simp. q. s.—Ft. bolus ter in die sumend.

That is, take of powdered myrrh, one scruple.—Prepared kali, three grains.—Conserve of orange peel, one scruple.—Simple syrup, as much as is sufficient.—Make into a bolus, to be taken three times a day.

Myrrh. pulv.—Spermacet. aa, gr. 15.—Syr. tolu; q. s.—Ft. bolus ter indies sumend.

That is, take of powdered myrrh.—Spermaceti, of each fifteen grains.—Syrup of Tolu, as much as is sufficient.—Make into a bolus, to be taken three times a day.

R. Myrrh. pulv. dr. 2½.—Cons. ros. rub. unq. 1.—Acid. vitriol. dil. dr. 2.—Syr. cort. aurant. q. s.—Ft. elect. cujus ter indies detur quod nucle. fructus myristice magnitudinem habeat.

That is, take of powdered myrrh, two drachms and a half.—Conserve of red roses, one ounce.—Diluted vitriolic acid, two drachms.—Syrup of orange peel, as much as is sufficient.—Make an electuary, of which the size of a nutmeg is to be taken three times a day.

These two last formulæ are chiefly employed in consumption.

SERPENTARIA.

The *serpentaria*, both in taste and flavour, is more agreeable than the other species, and it is by its sensible qualities of bitterness and aromatic acrimony that we can account for the virtues justly ascribed to it.

Both these qualities render it antiseptic, and powerfully tonic; and therefore suited to prevent gangrene. The same qualities will account for its cure of intermittent fevers, especially when combined with Peruvian bark and astringents.

By its aromatic acrimony it proves a powerful stimulant to the system; and therefore may be useful also in some cases of putrid fevers: but as the cure of either intermittent or continued fevers by stimulants alone is an ambiguous and dangerous practice, so in the former it is only safe when joined with the bark; and the use of it in continued fevers is to be employed with much caution. The common opinion of its alexipharmic powers, both with respect to it and all the others which have gone under the same title, is an incorrect and false notion, liable to much abuse, and which I have had frequent occasion to observe. The stimulant power of the *serpentaria* is especially suited to the low and advanced state of the typhus only; and even then it will be more safely joined with the bark than employed for its stimulant power alone. It is certainly owing to this ambiguity in its use, that it is not nearly so much employed in practice as it was some forty years ago.

R. *Serpent. contus.*—*Contraerv. contus.* ʒā dr. ʒ.—*Aq. fervent.* unc. 14.—*Macerate et liquor. frige fact. cola. cui adde tinct. serpent. unc. 1.*—*Syr. simp. unc. ½*—*Dentur coch. tria. 4tâ quâque horâ.*

That is, take of bruised *serpentaria*.—Bruised *contraerva*, of each three drachms.—Boiling water, fourteen ounces.—Macerate, and strain off when cold, to which add one ounce
of

of tincture of *serpentaria*.—Half an ounce of simple syrup.—
Let three table spoonfuls be given every four hours.

CAMPHORA.

Camphor.—This substance, as we have it in our shops, and employ it in medicine, is obtained from a tree now sufficiently known to our botanists, and distinguished by the trivial name of *Laurus Camphora*. What we employ is chiefly the growth of Japan, though there are several other trees in the East Indies which afford the same substance. But as I do not know that the camphor obtained from these other trees is ever brought into Europe for the purpose of medicine, or, if they are, that they differ in the least from that which we commonly employ, I do not think it necessary for me to prosecute the natural history of it further; nor is it anywise proper for me to speak of the manner in which this substance is obtained from the trees affording it; of the different states in which it is found and transmitted to Europe; or of the several operations by which it is brought into that form in which we have it in our shops.

These are particulars that may be of some curiosity with respect to chemistry and trade; but there is certainly no foreign drug so little liable to any variation or adulteration, or that comes into our hands so steadily and uniformly of the same appearance and qualities, and therefore requiring less of our acquaintance with its previous history.

With a view to its medicinal history, it may be proper to remark, that since we became acquainted with this peculiar substance from the East Indies, the chemists have supposed, that a substance precisely of the same kind was to be found in many European plants. In many instances they have supposed this without any clear proof; but they have certainly, in several instances, demonstrated its existence in the clearest manner. It does not, however, seem necessary to enter into any enumeration of those plants; because, even in the instances in which the presence of camphor is most clearly demonstrated, it is even in these in such small proportion, that it has not given any modification of their ordinary virtues, or that these substances have been employed, or can be employed,

as a medicine, for the purposes which camphor, in its separate state, is, or may be, employed.

After setting aside so many particulars that might have entered into a treatise of camphor, it is time for me now to come to my proper business, which is the consideration of camphor as a medicine. This I find to be a difficult task, as I must encounter the various and contradictory opinions that have been maintained with respect to it.

The opposition of opinions appears strongly from hence, that the controversy has been commonly brought into the single question, whether camphor be a heating or a cooling medicine with respect to the human body? or, as I would put it in other words, whether it is a stimulant or a sedative power? the question has been often attempted to be determined by frivolous and ill-founded theories, both on one side and the other; but these shall be here entirely neglected, as we judge the question must be absolutely determined by experiments made upon the human body, assisted however by some analogy, wherever it can be safely drawn, from experiments on brutes.

To this purpose we remark, in the first place, that camphor taken into the mouth, is of an acrid taste; and though, by its evaporation, it excites a sense of cold air, what remains is a sense of heat in the mouth and fauces: and when taken down into the stomach, it often gives some pain and uneasiness, which we impute to the operation of its acrimony upon the upper orifice of that organ. These may be considered as marks of its heating quality; and the same are more strongly marked by its application to any ulcerated part, which it always evidently irritates and inflames.

The best formulæ are:

R. Mist. camphor. unc. 1.—Aq. ammon. acet. unc. $\frac{1}{2}$.—Syr. croci. di. $\frac{1}{2}$.—M. Fl. haustus, 6ta. quâque horâ sumend.

That is, take of camphorated mixture, an ounce.—Water of acetated ammonia, half an ounce.—Syrup of crocus, half a drachm.—For a draught to be taken every six hours.

R. Mist. camphor. unc. $\frac{1}{2}$.—Tinct. valer. vol. gtt. 60.—M. Fl. haustus bis die sumend.

That is, take of camphorated mixture, an ounce and a half.
Volatile

Volatile tincture of valerian, sixty drops.—For a draught to be taken twice a day.

R. Mist. camphor. unc. 1 $\frac{1}{2}$.—Spir. ammon. fetid. dr. 1.—Syr. zingib. dr. $\frac{1}{2}$.—Ft. haustus ter die sumend.

That is, take of camphorated mixture, an ounce and a half. Fetid spirit of ammonia, one drachm.—Syrup of ginger, half a drachm.—For a draught to be taken three times a day.

R. Camphor.—Castor.—Mosch. aa gr. 5.—Syr. pap. alb q. s.—Ft. bolus ter in die sumend.

The formulæ are usually employed in what are more commonly known by nervous affections.

CASCARILLA.

I have been uncertain where to place this substance, whether here with the aromatics or with the astringents; and I am of opinion that the latter is its proper place. It approaches to the aromatics by its essential oil; yet its bitter, to be extracted by either water or spirit, is its most considerable part.

It was introduced into practice in the last century as a medicine of great value, both in continued and in intermittent fevers; and the Stahlians, fond of any thing as a substitute for the Peruvian bark, against which they had declared so strongly, received the cascarilla, and employed it much in practice, and have given many testimonies of its efficacy; but these testimonies have not been supported by other practitioners since; and particularly in this country we have found it a very weak substitute for the Peruvian bark. Bergius says of it, "*Tamen fatendum illam in ipsis febribus parum facere, neque tertianis vernalibus certo mederi.*" Our experience in this country is satiable to this; and in several trials it has entirely failed. What Bergius adds to the passage quoted, "*Sed in hæmoptyse sæpe prodest.*" is not supported by our experience; and in hemorrhagies of all kinds, it seems to be rather hurtful, as might be expected from its aromatic and bitter qualities, while it does not discover a sufficient astringent power. It may be allowed to be of tonic and stomachic virtue; but even in this way its virtues are not peculiar nor considerable: and there is no just foundation for the prejudices which the German physicians have conceived in its favour,

The following is an excellent formulæ :

R. Cascaril. contus. unc. ½. —Aq. fervent. unc. 12.—Macerate per horas sex, liquorem frigidum cola, et colatis unc. vii 7, adde tinct. corticis cascaril. unc. 1.—Capt. ter quaterve indies cochlearia quatuor.

That is, take of cascarilla bruised, half an ounce.—Boiling water, twelve ounces.—Macerate for six hours, strain the liquid when cold, and add to it tincture of cascarilla, an ounce.—Four table spoonfuls are to be taken three or four times a day.

ASARUM.

In large doses the *asarabacca* is very powerful, and sometimes too violent ; but in more moderate doses, not exceeding a few grains, and repeated for several evenings together, it may be employed to procure a pretty large watery discharge from the nose ; and which sometimes continues for several days together. By this it has the general effects of errhines, and has particularly proved very useful in tooth-ach and ophthalmias.

It is properly the basis of the pulvis sternutatorius of our colleges ; but I judge the London College have added too large a proportion of other cephalic plants, which renders the dose of the chief ingredient, the asarum, by much more bulky than convenient ; and that the Edinburgh college have given a composition much more convenient for a proper exhibition. I find that three grains of asarum is a proper dose ; and that four grains of the whole powder makes a convenient snuff.

ESSENTIAL OILS.

We need not mention here cinnamon and peppermint water, and the essential oils which are only in use for covering the tastes of medicines, having but slight stimulant power.

PRACTICAL OBSERVATIONS.

SECT. XC.

TONIC STIMULANTS.

FERRUM SIVE CHALYBS.

Steel or Iron.—BOTH titles stand in the catalogue of the London College: and in preparing the rubigo, they seem to have preferred the chalybs; but on what foundation we cannot perceive. We suppose it to be quite indifferent whether the one or the other is employed; but if we were to give any preference, we should think it due to the iron in its soft malleable state, or in what we call Forged Iron.

As iron, like all other metals, in its solid and entire state, is not active with regard to our bodies, without being corroded or dissolved by saline matters, so we judge it to be rendered active only by being combined with acids. It has been common enough to give the entire metal, brought by filing into a fine powder, and with very good effects, as a medicine. This, however, we do not consider as any exception to our general rule: for we are persuaded that there is constantly present in the human stomach a quantity of acid capable of dissolving iron; and we hold this to be a proof of it, that we never knew iron given in its metallic or slightly corroded state, without producing a blackness in the stools, which to us always presumes a previous solution of the iron in acids.

As this combination with acids is necessary, so physicians and chemists have diversified this combination a hundred ways: and we do not know a preparation of iron for the purpose of
medicine

medicine, that has not been prepared by a combination with acids, or by bringing the iron into a state that rendered it readily soluble by the acid of the stomach; and Dr. Lewis very properly observes, that Prussian blue, though truly containing a quantity of iron, as it is not soluble in any acid, is the least promising of all the medicinal preparations.

I do not think it necessary to enumerate here the various preparations that have formerly stood, or still stand, in our dispensaries, as they all agree in the same medical virtue, and are only proper as convenient for being exhibited in different forms. The Edinburgh College have endeavoured to make an improvement in preparing a spirituous tincture, as the tinctures of that kind formerly prepared were liable in keeping to let fall a portion of what they had dissolved, and of thereby becoming constantly weaker the longer they were kept. The Edinburgh College, as taught by Dr. Black, have now obviated this, by ordering the tincture to be made of the squamæ ferri.

Iron combined with acids becomes an astringent substance; and upon its astringent and tonic powers its medicinal virtue entirely depend: for by increasing the tone of the vessels it increases their vigour and activity.

We do not think it necessary here to take any notice of the doctrine of Menghini concerning the iron constantly present in the blood of animals, or the manner in which it is introduced into it. We think it is enough to say, that his experiments, both on men and brutes, shew clearly that iron introduced into the stomach, and acting there, has the power of increasing appetite, and the vigour of the circulation.

Physicians formerly supposed that iron had a double power, of sometimes increasing and sometime, restraining evacuation, and fancied that different preparations possessed these different powers: but in this they were mistaken, as we have maintained above, that every preparation soluble in acids, has the same astringent and tonic power; and the Croci which were distinguished as aperient or astringent, have commonly neither the one nor the other quality.

It is, however, still true, that the same preparation, as Dr. Lewis has judiciously observed, may sometimes exert an aperient and sometimes an astringent power, according to the state of the body they are applied to. If, for example, a re-

tention

tion of menses depends upon a weakness in the vessels of the uterus, chalybeate medicines, by invigorating the force of the vessels, may cure the diseases and may thereby appear to be aperient: and, on the contrary, in a menorrhagia, when the disease depends upon a laxity of the extreme vessels of the uterus, iron exhibited, by restoring the tone of these vessels, may show an astringent operation.

By considerations of this kind, the inutility or propriety of the medicinal preparations of iron may be determined. In cases of a general flaccidity, as it is frequently marked under the title of Cachexy, and in all cases of evacuations from laxity, whether sanguine or serous, they are likely to be the most effectual remedies.

We are persuaded that the good effects of the preparations of iron have been often missed by their being given in too small doses. The saline preparations, in large doses, are ready to irritate the stomach; and both on this account, and on some other considerations, it may be always proper to begin with small doses, and to increase them by degrees: but we have often found, that no great benefit is to be obtained but when large quantities, either by the size of the doses, or by the long continuance of them, have been thrown in. We have found the simple rust as effectual as any other preparation, and we have always found the stomach bear it better than any other. We begin with a dose of five grains, but increase it gradually to what the stomach easily bears. I think the stomach commonly bears it better by some aromatic being joined with it.

The following are the best formulæ:

R. Fer. vitriolat.—Extract. cinchon. aa dr. ʒ.—F. pil. 20.—Capt. pil. 1. horâ xi. matutin. et horâ vi. vespere sing. diebus.

That is, take of vitriolated iron.—Extract. of bark; equal parts, half a drachm.—Make into 20 pills. Take one at eleven in the forenoon, and at six in the evening, every day.

R. Ferri ammoniac. gr. 5, vul.—Ferri vitriolat. gr. 3.—Pulv. myrrh. comp. gr. 15.—Bene simul teratur, et syrupo zingiberis fiat bolus bis in die sumendus.

That

That is, take of ammoniacal iron, five grains, or vitriolated iron, three grains.—Compound powder of myrrh, fifteen grains.—Rub them well together, and with syrup of ginger make a bolus, to be taken twice a day.

R. Fer. vitriolat. pulv. gr. 12.—Extr. gentian. dr. 2.—Ol. essentielle. menth. piſ. gtt. 6.—Simul contunde, et massam in pilulas 30 divide; quarum tres vel quatuor bis in die sumantur, ex poculo infusi florum chamameli.

That is, take of vitriolated iron in powder, twelve grains.—Extract of gentian, two drachms.—Essential oil of peppermint, six drops.—pound them together, and divide the mass into thirty pills, of which three or four are to be taken twice a day, in a cup of infusion of camomile flowers.

R. Fer. vitriolat. gr. 2.—Quassia, gr. 3.—Rhei, zingib. aa gr. 4.—Mucil. gum. arab. q. s.—F. bolus bis die sumend.

That is, take of vitriolated iron, two grains.—Quassia, three grains.—Rhubarb and ginger in powder, of each, four grains.—Mucilage of gum arabic, as much as is sufficient.—Make into a bolus to be taken twice a day.

R. Ferr. vitriolat.—Extract. gentian.—Rhei pulv. aa gr. 10.—Myrrh. pulv. scr. 1½.—Syr. zingib. q. s.—F. pil. 20, quarum cap. 2, hora xi. matutin. et hora vi. vespere sing. diebus.

• That is, take of vitriolated iron.—Extract of gentian.—Powdered rhubarb, of each ten grains.—Powdered myrrh, a scruple and a half.—Make 20 pills, of which take 2 at eleven, and at six, every day.

R. Tinct. fer. muriat. dr. 4.—Spirit. cinnam. unc. 1½.—Cap. coch. minimum unum vel alterum, bis in die, ex aqua puræ tepidæ cyatho.

• That is, take of tincture of muriated iron, four drachms.—Spirit of cinnamon, an ounce and a half.—Take one or two tea spoonfuls twice a day in a cup of pure warm water.

R. Ferr. vitriolat. gr. 12.—Kali ppti. dr. ½.—Myrrh. pulv. dr. 1.—Mucil. arab. gum. dr. 2.—Decoct. glycyrr. rad. unc. 6½.—Spit. piment. unc. 1.—Tere myrrham et ferrum vitriolatum cum kali et mucilagine, donec perfecte commisceantur, dein adde reliqua. Dosis uncia una, bis terve sing. diebus.

That

That is, take of vitriolated iron, twelve grains.—Prepared kali, half a drachm.—Powder of myrrh, one drachm.—Mucilage of gum arabic, two drachms.—Decoction of liquorice root, six ounces and a half.—Spirit of pimento, an ounce.—Rub the myrrh and vitriolated iron with the kali and mucilage, until they perfectly unite, then add the other ingredient. The dose is an ounce, twice or three times a day.

R. Ferri vitriolat. gr. 12.—Myrrh. in pulv. tit. ser. 2.—Bene conterantur, et gradatim adde aq. kali præp. gtt. 25, at ll. massa in pil. 12 æquales dividenda; harum sumantur due ter quotidie.

That is, take of vitriolated iron, twelve grains.—Myrrh in powder, two scruples.—Rub them well together, and gradually add water of prepared kali, twenty-five drops, so as to make a mass to be divided into twelve equal pills, of which two are to be taken three times a day.

R. Ferri rubr. pulv. dr. 1½.—Cinchon. pulv. unc. 1.—Cinnamon. flor. pulv. unc. ½.—Syr. cort. aur. q. s.—Ft. elect. de quo sumat nuclei fructus myristicæ instar, ter quotidie.

That is, take of rust of iron, a drachm and a half.—Bark powder, an ounce.—Cinnamon flowers in powder, half an ounce.—Syrup of orange peel, as much as is sufficient.—Make into an electuary, of which the size of a nutmeg is to be taken three times a day.

R. Ferr. Rubigin. vel.—Ferr. tartarisat. dr. 2.—Cons. absinth. maritim. vel.—Cons. aurant. cort. unc. 1½.—F. Elect. cap. coch. minutum, ex tantillo vini rubri lusitanici bis in die.

That is, take of rust of iron, or tartarised iron, two drachms.—Conserve of sea-wormwood, or conserve of orange peel, an ounce and a half.—Make into an electuary, of which take a small tea spoonful with a glass of red wine twice a day.

CUPRUM.

Copper.—I have no doubt of putting this metal into the list of astringents; for though it possesses very strongly stimulant powers, which often prevent our perceiving its astringency, yet

we can, by employing the milder preparations of it, or perhaps by preparing it, so as to take away the whole of its stimulant quality, obtain its tonic effects.

I give the blue vitriol in the dose of a quarter or half a grain according to the age of the person; and in repeating the medicine twice a day, I increase the dose to what the stomach will bear without vomiting, but allow it to go so far as to occasion some sickness and even nausea. This medicine continued for some time, has proved an useful tonic in certain cases of epilepsy and hysteria. On some occasions it has proved diuretic; and on some others anthelmintic. The combination of copper with an ammoniacal salt, I learned from the *Acta Naturæ curios*; and first introduced it into the practice of this country; and it now stands in our Dispensatory under the title of the *Cuprum ammoniacum* *. In many instances it has proved a cure of epilepsy, and thereby discovered its astringent and tonic power. It is employed in the same manner as I have said above of the blue vitriol, by beginning with small doses of half a grain, and increasing these by degrees to what the stomach will bear. I find it commonly more manageable than the blue vitriol; and in many instances have carried the dose to five grains, and in some still farther. In many cases it has proved a cure of epilepsy; but in many others it has entirely failed in being such. When, in the course of a month, it has not shown any good effects, I desist from its further use, as I suspect that large quantities of copper introduced may, like lead, prove hurtful to the body; and therefore, in cases of periodical epilepsy, after giving the medicine constantly during one interval, if the disease still continues, I afterwards give the medicine only for some days before an expected accession; and in this manner I have had success.

The escharotic powers of the preparations of copper have been known and employed from the most ancient times for cleansing foul ulcers, and bringing them to discharge a laudable pus; but since the introduction of the use of mercury in the 16th century, the preparations of this have been more commonly employed.

* Cullen.

The astringent powers of the preparations of copper have especially appeared in the application of them to the eyes; and we have known a weak solution of *verdegriis* useful in restraining inflammation: but it is so ready to prove irritating to that sensible organ, that a great deal of nicety is necessary in the employment of it; and we seem to have a milder preparation in the *aqua sapphirina*. It is, however, absurd to order this preparation in such a manner as to allow the strength of it to be liable to much uncertainty; and the Edinburgh College have properly ordered it so as it may be brought to a standard. It has commonly been supposed, that the *aqua sapphirina* was suited to take off specks or opaque spots that appear upon the cornea, and which has been supposed to imply an escharotic power: but this certainly is seldom the case; and it seems to act only by an astringent power, diminishing the impetus of the fluids in the vessels which terminate in the

PLUMBUM.

Lead.—The astringent powers of the saline preparations of this metal are now sufficiently ascertained; but at the same time it is equally well known, that all these preparations, and the vapours exhaled from the metal itself, or its calces, introduced into the body, discover a sedative power extremely noxious to the human system. It is therefore difficult to determine how far we can employ the astringent and tonic operation of this metal, and be at the same time secure against its deleterious powers, especially as these deleterious powers do not always immediately discover their operation, and very often only after they have long remained latent and unheeded in the body.

This seems to be so much the case at present, that hardly any practitioner will now think of employing any preparation of lead as internal medicines: but in proportion as the favour for these has declined, that for its external use has greatly increased. We are, however, at a loss to determine positively, what is its operation, or to explain in many cases where its effects are evident, how the supposed operations could produce them. It is the writing of Mr. Goulard of Montpellier, that

that has raised these doubts. It is difficult to deny facts positively asserted; but we find in Goulard's writing so many facts not confirmed by our own experience, so many marks of partiality to the medicine he recommends, and so much frivolous theory by which he supports it; that his credit with me is indeed very little. I am much of opinion, that nobody can consult him with safety, without attending to the very judicious and ingenious criticism published on the subject by Mr. Aiken of Warrington; and I am disposed to leave my readers to be most properly informed of the virtues of lead applied externally in lotion, poultice, or ointment, to Mr. Aiken's work. I have only this to observe, that Mr. Aiken seems disposed to think, that the saline preparations of lead, externally applied, never enter into the system in such quantity as to affect the general system in the same manner as they commonly do when introduced by the mouth, or when the vapours of lead are applied. But Dr. Percival has given us a fact that may lead us to believe, that Dr. Aiken's opinion is not well founded; and we judge it to be very probable, that though lead applied to the entire surface can hardly enter in such quantity as to be noxious to the system, yet that when applied to an ulcerated surface capable of a promiscuous absorption, it may be taken in such quantity as to affect the general system.

ZINCUM.

Zinc.—That the saline preparations of this metal act as astringents, we know very well from the operation of white vitriol, so very frequently applied to the eyes. It has been used in different proportions; and when in large proportions, it certainly proves very irritating: but it may certainly be used with great safety in a greater proportion than that of two grains to the ounce of water, as it is in the aqua vitriolica of the last edition of the Edinburgh Dispensatory; and the London College seems to be of that opinion.

The flores zinci, as a matter liable to be corroded by the acid of the stomach, and thereby rendered active, has been lately, upon the authority of the late excellent Dr. Gaubius, introduced into frequent practice as an antispasmodic, or as f

consider it as an astringent and tonic. It has now been frequently employed here in epilepsy, hysteria, and some other spasmodic diseases, as the chorea, and others. In epilepsy, they never answered with Dr. Gaubius himself; nor have they, that I know of, here, though given in much larger doses than he seems ever to have employed.

In remote parts of the country, in which the flores zinci were not to be had, I have frequently prescribed the vitriolum album; and in some cases with as good effect as in any of those in which I had employed the flores zinci.

The following are the usual formulae:

R. Zinc. vitriolat. scr. 1.—Cons. ros. rubr. q. s.—Ft. pil. 20.—Capt. pil. una vel altera bis terve indices.

That is, take of vitriolated zinc, a scruple.—Conserve of red roses, as much as is sufficient.—Make into twenty pills, one or two of which are to be taken twice or thrice a day.

R. Zinc. calcinat. gr. 4.—Cons. ros. rubr. q. s.—F. bolus bis in die sumend.

That is, take of calcined zinc, four grains.—Conserve of red roses, as much as is sufficient.—Make into a bolus to be taken twice a day.

SILVER.

The caustic qualities of acids, though entirely destroyed by their being combined with alkalines and earths, are not so by their being combined with metals. The nitrous acid combined with silver, gives the lunar caustic very commonly employed; and the muriatic acid, in a concentrated state, joined with antimony, gives what is commonly called the butter of antimony, one of the strongest caustics known. These metallic caustics are attended with the same inconvenience as the simple acids; that is, of being ready to spread beyond the bounds intended for them: but this is more easily managed with respect to the lunar caustic, which can be got in a solid form, than with respect to the butter of antimony, necessarily liquid; and this gives the reason why the latter is more rarely employed.

It is here to be observed, that these corrosive matters are in

different degrees of strength; and when they are not sufficient to dissolve the more solid parts, they still may be fit to dissolve those more tender fungous excrescences which arise in ulcers. Thus it happens, that alum having a considerable portion of its watery parts exhaled, and its acid thereby concentrated, is thereby rendered capable of consuming the fungous growth in ulcers. It is, however, always a weak escharotic; and we have a stronger kind in the preparations of mercury and copper. Both these preparations are noted for their cleansing foul sores, bringing them to discharge a proper part, necessary to their healing; and I ascribe all this to their escharotic power.

Lunar caustic has of late been applied for the cure of epilepsy, a grain, or more being given in the form of pills, four times a day.

HYDRARGYRUS.

Mercury.—This, as an universal stimulant, and as very commonly reaching the extreme vessels, may be capable of stimulating those of the uterus, and therefore of proving an emmenagogue. Upon this supposition it is introduced here; and, from several trials, I am persuaded that the continued use of mercury has proved a cure of suppressions. How far it may be employed in cases of retention I am uncertain; but am of opinion, that it can be neither so safely nor so effectually employed in these as in the cases of suppression. It must not in cases of weakness be too freely employed. In obstructions of the liver, &c. mercury is often successfully employed*.

* These remarks on the articles of the Materia Medica, are chiefly from Dr. Cullen, whose valuable work on this subject, was written after an experience of more than fifty years. The Formulae are chiefly from the *Formulae Selectae* of Guy's Hospital, which, by its union with St. Thomas's Hospital, and the indefatigable zeal of its able teachers, (Dr. Fordyce and Dr. Saunders are the lecturers on the practice of Physic, Dr. Babington on Chemistry and Materia Medica, Dr. Haighton on Physiology and Midwifery, Mr. Cline on Anatomy, Mr. Ashley Cooper on Surgery, Mr. Roberts on Experimental Philosophy, and Dr. Thornton on Medical Botany.—The weekly Clinical Lectures are by Dr. Saunders, Dr. Relph, and Dr. Harvey) is now become a school for medicine, even rivalling the universities, and surely possessing a superiority over them by the greater opportunity it affords of cases which daily present themselves in surgery and medicine.

ELECTRICITY.

BALNEA TEPIDA.

However those who never use it may choose to speculate upon the *tepid bath*, experience, in places where it is employed with almost incredible perseverance, is decidedly in favour of its strengthening power. At Pfeffers, in Switzerland, (which is esteemed one of the purest of all waters from impregnation), from seven to twelve hours are daily spent in the bath, and this upon the average is continued for a couple of months. Dr. Tissot says he has been very credibly informed, that at a bathing place in the Valais, patients pass the greater part of the time of their residence in the water. Dr. Marcard attests, that at Baden in Argow, he has himself seen invalids sit four or five hours in the bath. The latest writers concerning the warm bath at Landecke in Silesia, where the bathers are immersed up to the chin, dissuade from too long a continuance in the water. To think six hours sufficient at one time. The usual course here is four, five, or six weeks. Those who use these several baths are, in common, weakly, & nervous

* At Pfeffers, and most of the Swiss baths, it is only the lower half of the body that is immersed. However the upper part is exposed to an atmosphere of warm vapours, which, according to the hypothesis of relaxation, ought to have as bad an effect as mere warm water — See Marcard, l. c. p. 64.

† To shew to what extent that active enquirer into the effects of bathing, whom I so frequently quote in this section, has carried his practice in cases of weakness, I shall transcribe one of the cases he relates. A woman about 30, had suffered excessively during three years, from pain, anxiety, spasms and sleepless nights. She took very little food, had, at times, a little feverishness, and was greatly emaciated.* For a year she had never been regular. The utmost effort to which she found herself equal, was sitting up in an arm chair, supported by pillows. She required to be turned in bed. She had taken a great deal of bark and other medicines. The disorder had not the appearance of consumption, nor of any incurable lesion of the abdominal viscera. Long continued and great exertions in attending the sick had preceded this illness.

From recollection of somewhat similar cases, the author resolved to recur to the tepid bath, notwithstanding the extreme debility and the prejudices against it. "I did not, says he, venture to repeat the baths in quick succession, on account of the patient's weakness, and

nervous people, such as instead of recovering their health (as they actually do), ought to be dissolved altogether, if the warmth given to the water had a relaxing operation. To many medical men in this country, such relations will appear as paradoxical, as to the generality of uninstructed readers. There can, therefore, be no occasion to add a warning against a rash imitation of the Swiss practice of bathing. The knowledge of the facts may however suggest useful reflections, and do away some of those prejudices that cramp the practitioner of physic in his operations, and in both these ways contribute to the ease of the afflicted.

Among the examples that tend to suggest just ideas of the power of the tepid bath, I have been struck with none more than by that which Dr. L. Frank, Physician to the great hospital at Milan, has recorded in a foreign journal (*Salzburgh Med. Chir. Journal* f. 1795. ii. 70). "Among the variety of considerations, says he, which Dr. Marcard alledges to prove that the tepid bath strengthens in place of weakening, as has been heretofore supposed, I question if there be any so well calculated to support his opinion as a fact perfectly familiar to us in Italy. It is well known that of the disease called *Pelagra*, which is exceedingly frequent among the peasants of Lombardy, one of the chief symptoms is excessive debility. This debility cannot be more certainly removed by any means than by the use of the tepid bath. It is so great, that many patients are obliged to be carried, though the bath is not above forty paces from the ward.

of the effort, attending the operation. Several days were interposed between every two immersions."

"The first trial produced visible benefit. The patient said, she felt stronger after it; and from that day forward, she slept better, though she went into the bath with some dread, having never before used it. After the sixth bath, that is, in about a fortnight, to my astonishment, she was able to rise from her chair. She daily acquired strength under a continuance of the bathing, became regular, and in two months, was perfectly well, and has continued so these three years.—In such a situation, I never saw a more striking effect from bathing. But how the doctrine of relaxation and reduction of strength will apply here, I must leave to others to decide." Marcard *l. c.* pp 67—69.

Many
v.

Many who can walk are yet so weak, that they cannot get into the water without support. The appearance of these people at going in and coming out, is truly miserable. Without being led by the attendants, they would stagger like drunken persons. In the space of four or at most of six weeks, they are commonly so much restored by the use of the warm bath, as to be able to return to their friends and their ordinary employments."

PEDILUVIUM.

Washing the feet.—This invites from the head, and may be said to be a stimulus to the whole frame. It is necessary after it to go into a warm bed. In forwarding the salutary return of the period in women, it has often been successfully employed.

ELECTRICITY.

The identity of the *electric fluid* and lightning has been clearly ascertained, and great hopes at first naturally arose that this so powerfully an engine of destruction, might, in scientific hands, prove a power productive of much good in certain diseases.

Although immense machines have been constructed, I doubt whether any patients confined to their beds, have been insulated, and filled with the electric fluid. Nothing of this kind, I know, has been done in putrid fever, and a variety of other diseases. This mode of electrifying has been used rather as a placebo to gain money from the patient, than with any direct views of experimental enquiry. If seeds germinate much sooner when insulated, without doubt, experiments of the same kind on the human body, which can be attended with no risk, deserve to be made. The electric aura in chronic inflammations of the eye has certainly done good.

The next mode of employing electricity has been by sending sparks to the patient, or insulating and filling him with electricity, and then drawing sparks from his person. This produces an immediate warmth and action on the parts so electrified, and if carried to any great extent, would raise a blister as strongly as the other vesicatories. The circulation is in this

way more encreased than even by the flesh-brush. In local affections it answers all the commendation given by its advocate, and hence its success in glandular swellings, in chilblains, and in speedily removing a black eye, or other congestions of blood. In muscular affections, the sequel of acute and gouty rheumatism, it does more than all the forms of embrocation. In deafness it certainly deserves to be tried, as also in blindness; and in paralytic affections it serves to amuse the enfeebled mind and body of the sufferer.

We would caution against its violent application, by shocks which can answer no good purpose whatever, and even in the other forms the reader will perceive that its powers are very limited, and hence when men separate themselves from the faculty, whom they deery, and exalt this power even beyond the bounds of probability, the public should be cautioned against *such*, as the object then is, to use the vulgar phrase, to make hay whilst the sun lasts, and the afflicted become the dupes of their unbounded avarice.

PRACTICAL OBSERVATIONS.

SECT. XCI.

ANTHELMINTICS .

IT is a known fact that thousands of children lose their lives annually by WORM-CAKES advertised by the *legal* and infamous destroyers of their fellow-creatures, whom for the sake of the *licence*, are still suffered to go on in their work of death in an enlightened period, and alas ! *no patriot* as yet has stood up to remedy this growing evil. The means advertised are, either arsenic, or other dangerous poisons, filings of pewter, containing often much arsenic, or powerful purges, and both age and sex, and constitution, are of necessity put out of the question, and the inward gnawings of the young sufferer are alone expressed by the writhings and contortion of his face and body. — The calculation of the *quack* is thus : “ I was in my youth a chimley-sweeper, next a scavenger, and now I am a tinker, or mender of kettles : this is as much allied to medicine, as shoe-making

* From *αντι*, against, and *ελμινις*, a worm.

" is to divinity. My brother, the cobbler, has
 " made a decent livelihood, and is much re-
 " spected, by turning from mending of soles, to
 " converting of souls, and he is a methodist
 " preacher, and why should not I ride in my
 " coach? I have no *mountabank*, to be sure, but
 " I can circulate hand-bills. In London alone
 " there are a million of people. If one dies in
 " seven years, many are ill before this comes,
 " and I may reckon 25,000, are ill. If my bill
 " reaches one in a hundred, and this one should
 " buy only a guinea's worth of my stuff, this
 " would give me 250*l.* a year, but this is
 " reckning too fast, there are so many to dis-
 " pise my bad spelling and lies, and so many
 " dedd people, whose friends tell tail, and so
 " many doctors too, that I must look to the
 " country, and there I find fifteen million of peo-
 " ple, and my stuff sells as well in the country
 " as in town, or better, not needing to see the
 " folk; and as I live upon onions, and follow
 " my trade for a time, and will advertise more
 " and more as I get on, the odds are much against
 " me, if with the *King's Arms, authority of Parlia-*
 " *ment, extracts from Gazettes*, but that I ride at last
 " "in my coach;" nor is his conjecture wrong, as
 we have daily instances. The water-casters, who
 see the disease, age, and sex of the patient in
 the urine, and hap-hazard kill or cure, the
 medicine being powerful, and the disorder sthenic,

or asthenic, have not half as much chance of a fortune, as the advertizing *quack*, and we find, therefore, there are fewer water-doctors than doctors of the other description. But it is time we should come to the formulæ, trusting that the necessity of a stop being put to such *wicked* abuses, will meet some *virtuous* legislator who will remedy this evil, to whom nothing farther need be said.

Before I make my observations on anthelmintic remedies, I shall first beg leave to give some experiments which I made in the year 1771, upon the common earth-worm, in order to ascertain the anthelmintic virtues of a variety of substances. I made choice of the earth-worm for this purpose, as it is, according to naturalists, exactly the same in its structure, manner of subsistence, and mode of propagating its species, with the round worm of the human body.

In the first column I shall set down, under distinct heads, the substances in which worms were placed; and in the second and third columns the time of their death, from the action of these substances upon them.

I. BITTER and ASTRINGENT Hours. Minutes.

SUBSTANCES.		
Watery Infusion of Aloes,	2	48
———— of Rhubarb,	1	30
———— of Peruvian bark,	1	30

II. PURGES.

Watery Infusion of Jalap,	1	—
———— of Bears-foot,	1	17
———— of Gamboge,	1	—

III. SALTS.

1. Acids.		
Vinegar, - - - - -	—	1½ convulsed.
Lime Juice, - - - - -	—	1
Diluted nitrous Acid,	—	1½

2. Alkali,

	Hours.	Minutes.
2. <i>Alkali.</i>		
A watery Solution of Salt of Tartar, - - - -	—	2 convulsed, throw- ing up a mucus on the surface of the water.
3. <i>Neutral Salts.</i>		
In a watery Solution of common Salt, - - -	—	1 convulsed.
— of Nitre, - - - -	—	ditto.
— of Sal Diuretic, - -	—	ditto.
— of Sal Ammoniac,	—	1½
— of common Salt and Sugar,	—	4
4. <i>Earthy and Metallic Salts.</i>		
In a watery Solution of Epsom Salt, - - -	—	15½
— of Rock Alum, - -	—	10
— of Corrosive Subli- mate, - - - -	—	1½ convulsed.
— of Calomel, - - -	—	49
— of Turpeth Mineral,	—	1 convulsed.
— of Sugar of Lead,	—	3
— of green Vitriol, - -	—	1
— of blue Vitriol, - -	—	10
— of white Vitriol, - -	—	30
IV. METALS.		
Filings of Steel, - - -	—	25½
Filings of Tin, - - - -	1	—
V. CALCAREOUS EARTH.		
Chalk, - - - - -	2	—
VI. SEDATIVE SUBSTANCES.		
Watery Infusion of Opium,	—	11½ convulsed.
— of Carolina Pink-root,	—	33
— of Tobacco,	—	14
VII. ESSENTIAL OILS.		
Oil of Wormwood, - -	—	3 convulsed.
— of Mint, - - - -	—	3
— of Caraway Seed,	—	3
— of Amber, - - -	—	1½
— of Anniseed, - - -	—	4½
— of Turpentine, - -	—	6
VIII. ARSENIC.		
A watery Solution of white Arsenic, - - - - -	near 2	

IX. FERMENTED LIQUORS.		Hours.	Minutes.
In Madeira Wine,	- - -	—	3 convulsed.
—Claret,	- - - - -	—	40
X. DISTILLED SPIRIT.			
Common Rum,	- - -	—	1 convulsed.
XI. THE FRESH JUICES OF RIPE FRUITS.			
The Juice of red Cherries,	—	—	5½
—of black ditto,	—	—	5
—of red Currants,	-	—	2½
—of Gooseberries,	-	—	3½
—of Whortleberries,	—	—	12
—of Blackberries,	- -	—	7
—of Raspberries,	- -	—	5½
—of Plumbs,	- - -	—	13
—of Peaches,	- - -	—	25
—of Watermelons, no effect,	—	—	—
XII. SACCHARINE SUB- STANCES.			
Honey,	- - - - -	—	7
Molasses,	- - - - -	—	7
Brown Sugar,	- - - - -	—	30
Manna,	- - - - -	—	2½
XIII. In AROMATIC SUB- STANCES.			
Camphor,	- - - - -	—	5
Pimento,	- - - - -	—	3½
Black Pepper,	- - - - -	—	45
XIV. FOETID SUBSTANCES.			
Juice of Onions,	- - -	—	3½
Watery Infusion of Assa- • fœtida,	- - - - -	—	27
—Stantonium, or Worm Seed,	1	—	—
XV. MISCELLANEOUS SUB- STANCES.			
Æthiops Mineral,	- - -	2	—
Sulphur,	- - - - -	2	—
Solution of Gunpowder,	—	—	1½
—of Soap,	- - -	—	19
Oxymel of Squills,	- - -	—	3½
* Sweet Oil,*	- - - - -	2	30

In the application of these experiments to the human body, an allowance must always be made for the alteration which the several anthelmintic substances that have been mentioned, may undergo from mixture and diffusion in the stomach and bowels.

In order to derive any benefit from these experiments, as well as from the observations that have been made upon anthelmintic medicines, it will be necessary to divide them into, such as act,

- I. Mechanically,
- II. Chemically upon worms; and,
- III. Into those which possess a power composed of chemical and mechanical qualities.

I. The mechanical medicines act indirectly and directly upon the worms.

Those mechanical medicines which act directly upon the worms, are, cowhage* and powder of tin. I had heard, says Mr. Chamberlaine, so much of the cowhage, or cowitch, that I resolved to make trial of it.

But the different modes of exhibiting it, were as various as the persons who took upon them that office. One administered it in melasses. Castor oil was the favourite vehicle of a second; and a third insisted, that it was of no service unless mixed with honey.

The greater number agreed in giving melasses the preference; but there was even among these, a considerable disagreement with regard to the proportions to be observed in the mixture. While some cautiously put but two pods of the cowhage into a quart of melasses, others boldly stirred up two dozen in a like quantity. Some again would have six pods to be sufficient; and others imagined that some secret virtue, or charm, was to be expected, from having the number neither greater, nor less, than exactly nine.

By some, the setæ contained on the outside of a single pod, mixed with one or two table-spoonfuls of syrup, honey, or melasses, was given for a single dose, without distinction, to young and old. By others, a quantity of each ingredient was mixed together, without bearing any exact proportion to each

* *Dolichos Pruriens*, of Linnæus.

other, farther than was merely sufficient to bring the composition to the consistence of an electuary; and one, two, or three tea-spoonfuls given as a dose to children, and one, and sometimes two table-spoonfuls to adults.

As far as I could learn, however different the compositions and proportions of the ingredients, the effects were found to be pretty much the same in all ages, sexes, and constitutions.

I considered, that the wonderful efficacy so generally attributed to the cowhage, could not be supposed to arise from any specific medicinal quality residing in it, so much as from the sharpness and elasticity of the setæ, with which the pods are covered, which take the same effect on worms, as they do when applied to our skin. The setæ piercing, vellicating, and tormenting them in such a manner, as obliges them to let go their hold; acting like so many needles, as may be plainly demonstrated by viewing the setæ through a microscope; which shews them to be a number of long spiculae, needle-shaped, hollow, transparent, and armed with points, exquisitely sharp and fine.

The idea, that their action is merely mechanical, is supported by the observations of several very judicious enquirers, who have made trial of the cowhage, particularly Doctor Leake; who, "in his Lectures on the theory and practice of midwifery, and diseases incident to children," enumerates the cowhage among the most effectual of those remedies given to children for worms. He supposes that it acts in the same manner as hair, cut fine, and given with the same intention, but much more effectually, because of its inflexibility, and the exquisite, and almost inconceivable sharpness of its points.

Curious to know how far the application of the setæ to the external coats of worms bred in the human body would affect the animals when expelled from the body, I waited not long before I had an opportunity of making the experiment.

A catabash full of very large ones, of the teres kind, in full vigour, voided by a poor emaciated patient, was brought to me. Among these, I sprinkled some of the setæ. For a minute or two no visible effect was produced; but in a little time they began to writhe and twist themselves in an unusual manner, and exhibited evident signs of extreme torture. I took one of the worms, and viewing it through a magnifying glass,

glass, perceived that several of the setæ had pierced very deep, and others were sticking loosely in various parts of its body, but that none of the spiculæ, which had once entered into the skin, dropped off.

Convinced in a short time, both from what I had heard, and from my own experiments, on the internal exhibition of cowitch, of the safety and efficacy of this incomparable medicine, I laid aside the cabbage-tree-bark, and for several years have used no other vermifuge than this.

My usual way of preparing and administering it, has been in the form of an electuary, with honey, melasses, or syrup, of a thick consistence, without observing any very exact proportion of the quantity of setæ.

Of this electuary, a tea-spoonful is a sufficient dose to young children; and to adults, one, or even two table-spoonfuls in a morning fasting. This may be repeated for two or three mornings; but in general, there is seldom occasion to go beyond the third dose; and a gentle purge of some kind or other, commonly completes the cure for the time.

The above-mentioned vehicles, (honey, &c.) blunt the spicule, and prevent their injuring the fauces and œsophagus; and are preferable to an oily vehicle, because, being diluted in the stomach, by the succus gastricus, the spiculæ are set free, and regaining their elasticity, enter into action; whereas oil, being not easily soluble by the secreted fluids of the stomach, still continues to sheath the points of these little spiculæ, and carries them through that viscus, and the intestines, without setting them free and by its lubricating quality, prevents them from taking effect, or injuring the worms they are sent to destroy. Oil is, therefore, an improper vehicle; and this will appear still plainer, if we consider, that to defend our hands from the troublesome effects of the setæ, when handling cowitch, it is necessary to oil the fingers.

No anatomist will ask, whether these spiculæ may not be injurious to the coats of the stomach and intestines? But, as I have been asked this question by many people, who, ignorant of the structure of the intestines, and the nature of this mucus, were apprehensive of danger, and therefore afraid to venture on the medicine; it may not be amiss to remark, for the satisfaction of such as are in doubt concerning that point, that

that if a little honey or treacle is sufficient to defend the tender nervous papilli of the mouth and fauces, from the troublesome effects of the setæ, (which, when applied externally to any part of our skin, cause a most tormenting and intolerable itching, sometimes almost even to madness) certainly the mucus of the stomach and intestines will be very sufficient to defend those parts from the irritation of the setæ.

Nevertheless, however inoffensive in general the Cowhage may be, reason will dictate to us, that where the mucus of the stomach and intestines is abraded, or lessened, from dysentery, cholera-morbus, or any other cause whatsoever; or where there is a tendency towards inflammation in any part of the intestinal canal, the exhibition of this medicine cannot be unattended with danger.

I shall not go so far as to say, in praise of this my favourite medicine, that I never knew it to fail; but I will say, that I have experienced more certain good effects, and fewer ill consequences, than from any other medicine, given with the same intention; insomuch, that I have, since I first began to exhibit the cowhage, had no occasion to look for any other vermifuge*.

The last of these medicines, tin, has been generally supposed to act chemically upon the worms, from the arsenic which adheres to it; but from the length of time a worm lived in a solution of white arsenic, it is probable the tin acts altogether mechanically upon them.

Those which act indirectly are, vomits, purge, bitter and astringent substances, particularly aloes, rhubarb, bark, bear's-foot, and worm-seed. Sweet-oil acts indirectly and very feebly upon worms. It was introduced into medicine from its efficacy in destroying the botts in horses; but the worms which infest the human bowels, are of a different nature, and possess very different organs of life from those which are found in the stomach of an horse.

* Vide a Practical Treatise on the Efficacy of STIZOLOBIUM, or Cowhage, (the *dolichos pruriens* of Linnæus) internally administered, in diseases occasioned by Worms. To which are added, Observations on other anthelmintics of the West-Indies, by William Chamberlaine, surgeon.

II. The medicines which act chemically upon worms, appear, from our experiments, to be very numerous.

Nature has wisely guarded children against the morbid effects of worms, by implanting in them an early appetite for common salt, ripe fruits and saccharine substances; all which appear to be among the most speedy and effectual poisons for worms. Let it not be said, that nature here counteracts her own purposes. Her conduct in this business is conformable to many of her operations in the human body, as well as throughout all her works. The bile is a necessary part of the animal fluids, and yet an appetite for ripe fruits seems to be implanted chiefly to obviate the consequences of its excess, or acrimony, in the summer and autumnal months.

The use of common salt, as an anthelmintic medicine, is both ancient and universal. Celsus recommends it. In Ireland it is a common practice to feed children, who are afflicted by worms, for a week or two upon a salt-sea weed, and when the bowels are well charged with it, to give a purge of wort, in order to carry off the worms, after they are debilitated by the salt diet. I have administered many pounds of common salt coloured with cochineal, in doses of half a drachm, upon an empty stomach in the morning, with great success in destroying worms.

Ever since I observed the effects of sugar and other sweet substances upon worms, I have recommended the liberal use of all of them in the diet of children, with the happiest effects. The sweet substances probably act in preventing the diseases from worms in the stomach only, into which they often insinuate themselves, especially in the morning. When we wish to dislodge worms from the bowels by sugar or melasses, we must give these substances in large quantities, so that they may escape in part the action of the stomach upon them.

I can say nothing from my own experience of the efficacy of the mineral salts, composed of copper, iron, and zinc, combined with vitriolic acid, in destroying worms in the bowels. Nor have I ever used the corrosive sublimate in small doses as an anthelmintic.

I have heard well-attested cases of the efficacy of the oil of turpentine in destroying worms.

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The expressed juices of onions and of garlic are very common remedies for worms. From one of the experiments it appears that the onion-juice possesses strong anthelmintic virtues.

I have often prescribed a tea-spoonful of gunpowder in the morning upon an empty stomach, with obvious advantage. The active medicine here is probably the nitre.

I have found a syrup made of the bark of the Jamaica cabbage-tree*, to be a powerful as well as a most agreeable anthelmintic medicine. It sometimes purges and vomits, but its good effects may be obtained without giving it in such doses as to produce these evacuations.

There is not a more certain anthelmintic than Carolina pink-root†. But as there have been instances of death having followed excessive doses of it, imprudently administered; and as children are often affected by giddiness, stupor, and a redness and pain in the eyes, after taking it, I acknowledge that I have generally preferred to it, less certain, but more safe medicines for destroying worms.

III. Of the medicines whose action is compounded of mechanical and chemical qualities, calomel, jalap, and the filings of steel, are the principal.

Calomel; in order to be effectual, must be given in large doses. It is a safe and powerful anthelmintic. Combined with jalap, it often brings away worms when given for other purposes.

Of all the medicines that I have administered, I know of none more safe and certain than the simple preparations of iron, whether they be given in the form of steel-filings or of the rust of iron. If ever they fail of success, it is because they are given in too small doses. I generally prescribe from five to twenty grains every morning, to children between one year and ten years old; and I have been taught by an old sea captain, who was cured of a tænia by this medicine, to give from two drachms to half an ounce of it, every morning, for three or four days, not only with safety, but with success.

* *Geoffrea*, of Linnæus.

† *Spigelia Marylandica*, of Linnæus.

The usual formulæ are :

R. Gambog. gr. 2.—Calomel. gr. 5.—Jalap. gr. 10.—Ft. pulv. primo mane sumend.

That is, take of gamboge, two grains.—Calomel, five grains.—Jalap, ten grains.—For a powder to be taken early in the morning.

R. Calomel.—Pulv. e chel. cancror. comp. aa gr. 3.—Antim. tart. gr. $\frac{1}{8}$ —Ft. pulv. primo mane sumend.

That is, take of calomel.—Compound powder of crab's claws, of each three grains.—Tartarized antimony, the eighth of a grain.—For a powder, to be taken early in the morning.

R. Calomel.—Scammon. antim. pulv. aa gr. 2.—Crystal. tart. gr. 10.—Ft. pulv. primo mane sumend.

That is, take of Calomel.—Scammony.—Antimonial powder, two grains.—Crystals of tartar, ten grains.—For a powder, to be taken early in the morning.

Calomel. gr. 4.—Rhei pulv. gr. 10.—Jalapii pulv. gr. 12.—M. F. pulv. mane sumend. in coct. uao syrup. violarum.

That is, take of calomel, four grains.—Rhubarb, ten grains.—Jalap, twelve grains.—For a powder, to be taken in the morning in a spoonful of syrup of violets.

R. Pulv. stan. scr. 1.—Pulv. Rhei. gr. 4.—Pulv. antim. gr. 3.—Ft. pulv. horâ somni sumend.

That is, take of powder of tin, a scruple.—Rhubarb, four grains.—Antimonial powder, three grains.—This is to be taken at bed-time.

R. Pulv. stan. dr. 1.—Calomel, gr. 1.—Ft. pulv. in facelle bis quotidie sumatur.

That is, take of powder of tin, one drachm.—Calomel, a gram.—For a powder to be taken mixed in honey twice a day.

R. Aloes socot. dr. $\frac{1}{2}$.—Sapon. dr. 1 $\frac{1}{2}$.—Syr. simp. q. s. Ft. pil. 30, quarum cap. pil. 3, sing. noctibus.

That is, take of socotorine aloes, half a drachm.—Soap, a drachm and a half.—Simple syrup, as much as is sufficient.—Make into thirty pills, of which take three every night.

R. Pulv. :

R. Pulv. aloet. cum ser. dr. 1.—Syr. zingib. q. s.—Ft. pil.
16 Sumantur duo vel tres sing. noctibus.

That is, take of aloetic powder with steel, a drachm, simple syrup as much as is sufficient.—Make into 16 pills, of which take two or three every night.

R. Aloes socot. dr. $\frac{1}{2}$ —Lact. vaccin. unc. 8.—Tere simul
ut fiat enema tepidum injiciendum.

That is, take of socotrine aloes, half a drachm.—Milk, eight ounces.—Mix them for a glyster to be thrown up warm.

R. Dolie rub. rigid. (Ph. Ed.) dr. 1.—Syr. simp. q. s. Ft. elect.—Capt. coch. minimum, sing. auroris, ad tertiam usque vicem.

That is, take of cowitch (Edin. Dispensatory) a drachm simple syrup, as much as is sufficient.—Make into an electuary, of which take a small tea spoonful for three successive mornings.

R. Spigel. rad. unc. $\frac{1}{2}$ —Aq. fervent. lb. 1.—Macera et liquori colato adde tinct. rhei. unc. 2.—Capt. coch. 3, bis quotidie.

That is, take of Indian pink, half an ounce.—Boiling water, a pint.—Macerate, and add to the strained liquor tincture of rhubarb, two ounces.—Take three table-spoonfuls of this twice a-day.

Having finished with the formulæ, let me advise the student in medicine to distrust his memory, and to copy them carefully into his pocket-book, and to make it his *Vade Mecum*, and with much facility, with a little practice, he will be able to alter them as the age, constitution and circumstances of his patients may require.

PRACTICAL OBSERVATIONS.

SECT. XCII.

THE OBJECTION TO EMETICS AND PURGES, IN
ASTHENIC DISEASES, ANSWERED.

To *prepare* for bark and other tonics is an old maxim, and, by this preparation was meant an emetic, or purge, or both. Dr. Brown would not admit of this, and said, that it was like pouring water and oil at the same time to make a fire, and he excluded the use of vomits and purges altogether in asthenic diseases. We who seek only after truth, are obliged to confess that in this, there appears a great defect, as daily practice must evince, for in diseases of debility, the humid phlegmatic state of the frame is, indeed, too obvious. This may be, perhaps, explained in the following way.

We have two sorts of vessels. The agents or vessels that convey, are the arteries with their appendages: those that carry away, are the absorbents. Of that which is conveyed, and that which is carried away, the quantity and quality differ according to the state of these two sets of vessels. Thus in a strong man, the discharge from an ulcer shall perceptibly differ from the discharge from an ulcer in a weak man—the matter filling the pustules of the small pox shall differ in different constitutions—but make the weak man stronger by wine, food, or medicine, and the discharge or matter in the pustules, shall alter in quantity and quality. At the same time, the strokes of the arteries may be felt to be altered in number and force.

When a strong, cold wind blows upon the eye, the liquid, which is a healthy state of that organ but just suffices to keep the
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the surface moist, overflows in profusion. We see the same thing happen with regard to the nostrils. In these cases, the evident destruction of the balance between the two sets of vessels, appears to depend on the lessened power of the absorbent vessels. Many phenomena render it credible, that by the first impression of cold (whether on account of their position or structure) these are commonly weakened more than the arteries. When the surface of the lungs, in the act of respiration, is repeatedly swept by cold air, the balance between the opposite sets of vessels is altered; and the more perhaps in favour of the arteries, as the organ or the constitution is weaker. The weaker also the absorbent vessels, the longer before the disturbed equilibrium is restored. A blister continues to discharge much longer in the weak than the strong.

When any of the above-mentioned surfaces are inflamed, the balance is also lost. At first there is too little moisture. Dryness is felt on sensible surfaces, as that of the nostrils, or huskiness in the throat. Here the absorbents act with unequally increased powers.—Afterwards there is an excess of secreted moisture, as is seen in the expectoration, and in the discharge from the nostrils. In old, weak people, a bad cold often occasions suffocation; so great is the quantity of secretion, or so little that of absorption by the vessels on the surface of the lungs: and in the greater or less viscosity, the yellowness or greenness of the expectorated matter, a variation of quality is manifest. Diseased secretions from the lungs differ in all degrees, from the tenuity almost of water, to the hardness of stone. The secretion, in these cases, is not confined to the surface; it extends to the whole substance of an organ, which is lax, spongy, or full of innumerable small cells, communicating with one another. In colds, the thickening of the membrane of the nose, and the sense of fullness in the chest, probably arise in part from excess of interior secretion, without adequate increase of absorption. Emetics here are often found of use to excite the absorbent system, and dislodge the adhering mucus of the lungs.

We come now to the consideration of the stomach. When this viscus is in a state of disease it is filled with mucus, and crudities are discovered in this organ, marked by a great loss

of appetite, by a sense of weight and uneasiness in the stomach, and particularly by the eructation of imperfectly digested matters.

This is to be relieved by exciting vomiting; and the use of this remedy, therefore, usually and properly begins the cure of this disease. The vomiting may be excited by various means, more gentle or more violent. The former may answer the purpose of evacuating the contents of the stomach: but emetics, and vomiting, may also excite the ordinary action of the stomach; and both, by variously agitating the system, and particularly by determining to the surface of the body, may contribute to remove the causes of the disease. But these latter effects can only be obtained by the use of emetics of the more powerful kind, such as the antimonial emetics especially are.

The second symptom to be palliated, is an excess of acidity, either in quantity or quality, in the contents of the stomach. In man there is a quantity of acceſcent aliment almost constantly taken in, and, as I think, always undergoes an acetous fermentation in the stomach; and it is therefore that, in the human stomach, and in the stomachs of all animals using vegetable food, there is always found an acid present. This acid, however, is generally innocent, and occasions no disorder, unless either the quantity of it is very large, or the acidity proceeds to a higher degree than usual. But, in either of these cases, the acid occasions various disorders, as flatulency, eructation, heartburn, gnawing pains of the stomach, irregular appetites and cravings, looseness, griping, emaciation, and debility. To obviate or remove these effects aggravating and continuing the disease, it is not only necessary to correct the acid present in the stomach; but, especially as this acid proves a ferment determining and increasing the acceſcency of the aliments afterwards taken in, it is proper also, as soon as possible, to correct the disposition to excessive acidity.

The acidity present in the stomach may be corrected by the use of alkaline salts, or absorbent earths; or by such substances, containing these, as can be decomposed by the acid of the stomach. Of the alkalines, the caustic is more effectual than the mild; and this accounts for the effects of lime-water. By employing absorbents, we avoid the excess of acids, which
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might sometimes take place. The absorbents are different, as they form a neutral more or less laxative; and hence the difference between magnesia alba and other absorbents. It is to be observed, that alkalines and absorbents may be employed to excess; as, when employed in large quantity, they may deprive the animal fluids of the acid necessary to their proper composition.

The disposition to acidity may be obviated by avoiding acescent aliments, and using animal-food little capable of acescency. This, however, cannot be long continued without corrupting the state of our blood; and as vegetable food cannot be entirely avoided, the excess of their acescency may in some measure be avoided, by chusing vegetable food the least disposed to a vinous fermentation, such as leavened bread and well fermented liquors, and, instead of fresh native acids, employing vinegar.

The acid arising from acescent matters in a sound state of the stomach, does not proceed to any high degree, or is again soon involved and made to disappear: but this does not always happen; and a more copious acidity, or a higher degree of it, may be produced, either from a change in the digestive fluids, become less fit to moderate fermentation and to cover acidity, or from their not being supplied in due quantity. How the former may be occasioned, we do not well understand; but we can readily perceive that the latter, perhaps the former also, may proceed from a weaker action of the muscular fibres of the stomach. In certain cases, sedative passions, immediately after they arise, occasion the appearance of acidity in the stomach which did not appear before; and the use of stimulants often corrects or obviates an acidity that would otherwise have appeared. From these considerations we conclude, that the production and subsistence of acidity in the stomach, is to be especially prevented by restoring and exciting the proper action of it, by the several means before mentioned.

We proceed now to the bowels. Dr. Whytt has justly observed, that when much phlegm is collected in the stomach and intestines, their nerves are rendered less sensible of the stimulus of the aliments, their absorbent vessels are partly obstructed, and the gastric and intestinal lymph are more sparingly secreted, or at least become more viscid.

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From multiplied observations, says the Rev. Mr. Townsend, I have been long since persuaded, that hypochondriac torpor originates in viscid mucus, and I have lately been confirmed in this idea by seeing a patient of the melancholic temperament, whose pulse, at the age of about fifty-six, beat only from 45 to 50 in a minute.

The physician, who attended him, did me the honour to acquaint me with the circumstance already mentioned, and informed me, that, neither by steel, nor by the most powerful cordial stimulants, could he excite the system, or increase either the pulsation of the artery or the vital heat.

I suggested the idea, that the reason why he could not excite the system was, that in the intestines there was something interposed between his medicines and the animated fibre. He was pleased with the idea, and determined to cleanse the alimentary canal from the viscid mucus; but before he could adopt this plan the patient died.

Having an opportunity to talk with his apothecary, I discovered that this gentleman had long been subject to hypochondriasis and to asthma, that he had been almost in the daily habit of taking squill vomits, which always brought off from his stomach, and frequently procured by stool, a quantity of tough and viscid phlegm, and that prior to his last attack of asthma, the complaint for which he consulted his physician, he had for a considerable time omitted his emetics.

Professor Macbride, of Dublin, judiciously observes, that the most common source of disturbance in the nervous system is acrid and offensive matter, either in the stomach or flexure of the duodenum; of which the symptoms are, in the tongue foulness, sordes, and thick sloughs; in the mouth a taste, bitter, sour, rancid, putrid; nausea and loss of appetite; pain in the left orifice and upper part of the stomach; weight and oppression about the præcordia; fulness of the hypochondria; heaviness, giddiness, and pain in the head; shivering and coldness of the extremities, with lassitude and loss of strength.

Professor Hoffman speaks of acrid, bilious matter in the intestines as the cause of spasm.

Materia acris biliosa flatuum & spasmodum genetrix.
Tom. II. p. 199.

"Acrid bilious matter is the cause equally of wind as of spasm."

To clear the bowels of this slime, drastic purgès* must be occasionally used, for then we arrive at the living fibre: for as Mr. Townsend justly observes, no effects will be produced by our medicines until this is the case. Thus if a drop of water is put into a candle, how does it spatter until this is removed, although the elements for combustion be proper, and upon doing this, we have immediately a vigorous flame.

Also during the exhibition of tonics, costiveness must be always obviated. There is so much connection between the several portions of the alimentary canal with respect to the peristaltic motion, that, if accelerated or retarded in any one part, the other parts of it are commonly affected in the same manner. Thus, as the brisker action of the stomach must accelerate the action of the intestines, so the slower action of the intestines must in some measure retard that of the stomach. It is therefore of consequence to the proper action of the stomach, that the peristaltic motion of the intestines determining their contents downward, be regularly continued; and that all costiveness, or interruption of that determination, be avoided. This may be done by the various means of exciting the action of the intestines: but it is to be observed here, that as every considerable evacuation of the intestines weakens their action, and is ready therefore to induce costiveness when the evacuation is over; so those purgatives which produce a large evacuation, are unfit for correcting the habit of costiveness. This, therefore, should be attempted by medicines which do no more than solicit the intestines to a more ready discharge of their present contents, without either hurrying their action, or increasing the excretions made into their cavity; either of which effects might produce a purging. There are, I think, certain medicines peculiarly proper on this occasion, as they seem to stimulate especially the great guts, and to act little on the higher parts of the intestinal canal.

* Calomel effects this more than any other purge. It may be called the brush of the intestines. If a pill of two grains be taken at night, it should be worked off the following morning with sena.

† As the Aloetic pill, vide p. 560 of this Volume.

PRACTICAL OBSERVATIONS

SECT. XXIII.

THE CURE OF DROPSY EXPLAINED

We come now to another consideration. Remedies of a debilitating nature have been recommended in dropsy, such as are employed in the chronic diseases, and in a philosophical work this certainly merits explanation.

In the first place it is generally observed, that during the nausea of an emetic, especially by that of squills, the motion of the heart and arteries are diminished, and hence a less expence of the irritable principle being wanted for the performance of their office, the *absorbent system* then possesses the hoarded wealth, if I may be allowed the expression, and resumes a temporary energy.

This is more remarkable still from the use of the foxglove*. It lowers the pulse sometimes under forty, and in this state of quiescence of the aortal system, the absorbents acquire energy from the stock of irritability not required by the heart and arteries, and a sudden cure of dropsy by this means has been effected.

Sometimes dropsies have been cured by drastic purges, as gamboge, jalap, and strong saline purgatives. This may be accounted for by the sudden depletion of the system, when the absorbents acquire fresh energy, their power (as is seen in hunger) being according to the wants of the system.

A long abstinence from food, and liquids, has also produced the same effect: but the curative indication is in tonic powers, as in the other diseases of asthenia, which should be employed immediately after the water has been evacuated.

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* Vide Vol. IV page 258.

END OF THE THIRD VOLUME.

